THE DEVELOPMENT OF A FRAMEWORK FOR SUSTAINABLE HOUSING DELIVERY IN LAGOS, NIGERIA

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Declaration

This work or any part thereof has not been previously presented in any form to the University or to any other body for the purposes of assessment, publication or any other purpose. Except for any express acknowledgement, references and/or bibliographies cited in the work, I confirm that the intellectual content of the work is the result of my efforts and no other person.

Signature: …….

Date: …….

Dedication

This thesis is dedicated to the almighty God who has made it possible for it to be written by me.

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Abstract

There is an estimated 16 million housing units shortfall in Nigeria and the government cannot meet the housing needs of Nigerians because of budgetary constraints and other competing needs. It is important to note that the leaders have failed on numerous occasions to tackle the key challenges associated with a lack of infrastructure development. The emphasis has been placed on the individual homeowners fulfilling all their own requirements.

The aim of this research is to develop a framework that will aid sustainable housing delivery in Lagos one of the most challenged areas of Nigeria. A clearer picture of the housing environment in Lagos was documented based on critical literature reviews, analysis of the reasons why there is a deficiency in housing and its infrastructure delivery. The aim of the researcher was following the identification of the challenges to draw up a framework that would assist the relevant stakeholders namely the householders, developers and government in overcoming these and delivering further sustainable housing.

The research was completed using a mixed method including qualitative and quantitative means of acquiring necessary information in the form of a detailed literature review followed by a questionnaire survey of 500 household respondents. A total of 496 sets of data were collected through the questionnaire survey and analysed using SPSS, Excel and selected statistical methods. Validation of the framework was done using focus group discussions with stakeholders. Interviews with key housing and government personnel were also held including an analysis of 5 case studies.

The key findings are that 1) the market economy approach along with flexible, efficient economic instruments are key factors in enabling the construction industry to positively respond to sustainable development in terms of resource efficiencies and environmental protection in a developing economy like Nigeria. 2) The social and political barriers cannot be overcome without a meeting of wills amongst the stakeholders. 3) There needs to be transparency and the desire to achieve the objective so the monitors will be effective to counteract dissatisfied individuals that will come out of the bureaucratic woodwork. 4) There needs to be an urban redesign driven by stakeholders keen to see government policy align with sustainable housing objectives.

Key recommendations from this research are that:

1) The government should partner with the private sector to provide enough homes for Nigerians.
2) The government should henceforth concentrate in outlining good policy framework for the sector providing much needed infrastructural and financial support that will encourage sustainability and systematic development of housing in the country.

The framework developed in this research is envisaged to be contributory in road mapping the way and identifying key attributes and strategy for delivering sustainable housing in Lagos, Nigeria.

Keywords: Sustainable housing, environment, government policy, urban redesign, framework

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Abbreviations and acronyms

The abbreviations and acronyms used in the present thesis are presented here for reference purposes. Each one is defined on its first use in a chapter.

BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
EC	European Commission
EP	English Partnerships
EPSRC	Engineering and Physical Sciences Research Council
EU	European Union
HA	Housing Association
JCT	Joint Contracts Tribunal
K	Kelvin
kWh	Kilowatt hours
LED	Light Emitting Diode
LNTDA	(Lagos New Towns Development Authority).
LSDPC	Lagos State Development and Planning Corporation
m	meter
M&E	Mechanical and Electrical
mg	milligrams
NBS	Nigerian Bureau of Statistics
NEPAD	The New Partnership for Africa's development
NGO	Non-governmental organisation
ODPM	Office of the Deputy Prime Minister
ONS	Office of National statistics
PFI	Private Finance Initiative
PPG	Planning policy guidance
PPP	Public Private Partnership
PV	Photovoltaic
RIBA	Royal Institute of British Architects
SAP	Standard Assessment Procedure
SIP	Structural Insulated Panel
SPG	Supplementary Planning Guidance

UK	United Kingdom
UN	United Nations
uPVC	unplasticised polyvinyl chloride
USA	United States of America
W	watt
WWF	World Wide Fund for Nature

CHAPTER 1: INTRODUCTION

1.01 Background of the Study

Lagos has a major shortfall of accommodation and is said to have a 5 million housing deficit now representing 31% of the estimated 18 million national housing deficit (Oloto & Adebayo, 2011) (Oshodi, 2010). This has generated some unsavoury consequences. Slums have increased in number from 42 in 1985 to over a 100 such that 11 million, out of 20 million Lagos residents, now live in slums (Igbinoba, 2009). Lagos residents face housing challenges because the city lacks government-built houses or estates and where they exist they are often bought over by the rich and those in government, who often rent them out at prices that are prohibitive for the poor people whom such accommodations are really meant for(Okoghenum, 2013).

1.02 Statement of the Problem

Nigeria belongs to the category of emerging economies (Durotoye, 2014) (Fraser, 2011) and Lagos, its commercial capital, is the most populous city in Nigeria and the second fastest growing city in Africa (Aluko & Fadamiro, 2015) (City Mayors, 2015). Lagos has to contend with problems such as overcrowding and unplanned human settlements, sprawl developments arising from rapid population growth (Enisan & Ogundiran, 2013). As such, increasing population in Lagos State is one of the attendant results of the urbanisation process. This poses enormous housing challenges due to rural-urban migration and growing birth rates (Olatayo & Adeboye, 2013) (Lalasz, 2006). In spite of a series of housing policies towards housing delivery there exists a gap between housing supply and demand. (Amao & Ilesanmi, 2013)

In developing policy it’s essential to have the key needs of the populace at the forefront. When strategic measures are taken sufficiently early, urban planning can have far reaching implications for future growth patterns. (Organisation for economic cooperation and development, 2001) (Maslow, 1943) said ‘basic shelter is what we all need initially' In Nigeria and Lagos specifically the shortfall for basic shelter is huge therefore speed is essential in building. The Nigerian government has a huge construction and infrastructure problem to resolve and not enough resources to deal with it. However housing is at the top of the scale as problems in this area create other issues and, if not catered for adequately, could make the government very unpopular. In terms of quantitative housing in Nigeria, the number of existing housing units including those being built throughout the length and breadth of the federation are not at par with the current demand. (Aluko, 2007)

In trying to resolve these issues, the government is pursuing various policy initiatives and programmes. Currently the Nigerian housing policy reform is plagued with the major dilemma of how to strike the delicate balance between market place liberalization, government intervention, and social mechanisms in the housing

process in order to achieve the desired goal of ensuring adequate access to decent housing for all. On one hand, the government is implementing broad deregulation policies in foreign exchange and finance markets, trade and investment, and industrial development within the framework of economic structural adjustment and reforms, which seek to promote private sector-led housing provision.
This policy orientation tends to discourage the use of innovative direct supply-side and demand-side subsidies to promote housing sector development. On the other hand, the government has continued to insist on ensuring adequate housing for all as a primary housing policy objective in the face of compelling arguments concerning the limitations of the unregulated market in achieving such an egalitarian objective. In the light of this basic contradiction and beyond, the housing condition of Nigerians has continued to decline under the current housing policy regime, with the majority of households still saddled with a lack of basic facilities alongside serious housing affordability problems. (Aribigbola, 2008)

Housing policy formulation and implementation in the country must take cognisance of the socioeconomic circumstances and condition of the people and reflect it in the policy. The present move or tendency on relying wholly on market forces of demand and supply and leaving housing to private initiatives will not solve the problems of housing shortages and quality in the country.

The Nigerian economy is not based on the same industrial nature as the developed countries and therefore there is no basis for comparison and total adaptability of the deregulation policy. The abject poverty is too high for people to grapple with without any social welfare packages to cushion the effects of economic rents (Aluko, 2007).

Sustainable urban design is essential in eliminating negative environmental impact in construction of housing for the required inhabitants. The damage to the environment has to be minimised by design and also ensuring the use of more local materials and labour. There is a need for developing and continually improving practise, procedures, products, services and standards for sustainable design. Questions asked could be how does it work, look or hold up. Community engagement ensures their participation in the process of sustainable urban design. It’s hoped that with further understanding of the issues which are coming to light now a more consistent approach will be put forward to tackle it.

1.03 Rationale of the study

Due to the increasing need for housing perceived in Lagos and the chaotic mode of housing construction. it is noted that Lagos has, by UN standards, achieved the mega city status yet presently lacks the infrastructural facilities, institutional and legal frameworks required to match the attendant challenges. (Ilesanmi, 2010) It was pertinent to endeavour to formulate a more strategic plan of housing delivery that would be sustainable.

The framework proposed is to assist in this process. It would help to bring some order and reasoning to the methods used and justification for prioritising one stakeholder over the other.

African leaders have learned from their own experiences that peace, security, democracy, good governance, human rights and sound economic management are conditions for sustainable development. They are making a pledge to work, both individually and collectively, to promote these principles in their countries and sub regions and on the continent. (Nepad, 2001). In Nigeria in particular, the issue of peace and security has taken a pivotal role due to the recent spate of terrorist activities predominantly in the northern part of the country. Lagos has fortunately been spared this problem and is able to pursue its housing development goals but its realised that the demand has grown as there is an influx of people from the affected parts of the country as well as the rural areas putting pressure on the already overstretched infrastructure and housing available. Within the period of this research, the population in Lagos has increased even further as Lagos and its environs is further becoming the location for various establishments and organisations to settle and operate from. (The Central Intelligence Agency, 2013)(Mutunga, et al., 2012) Half of humanity now lives in cities. This will increase to 60 per cent within two decades. In the last two decades, the urban population of the developing world has increased by approximately 193,000 people per week. The rate of change in urban populations in Africa (over 3 per cent), is the highest in the world. (UN Habitat, 2010) (World Health Organisation, 2014)

(Cole, 1998) states that we are clearly still very much in our infancy of understanding and practising environmental responsibility and more significantly, are far from developing the means to affect significant positive change. He defines environmental assessment as those techniques developed to specifically evaluate the performance of a building design or completed building across a broad range of environmental consideration. (Cole, 2000). It is apparent that in the developing countries we are even further behind than the developed countries in these aspects.

1.04 Aim and Objectives

The aim of this study is to develop a framework for the provision of sustainable housing units for a fast growing Lagos state population in Nigeria. It is hoped this will identify some areas for change via a clearer picture of the housing environment. It was also envisaged that the various reasons for deficiencies in housing and its infrastructure delivery were analysed. In addition a framework that can aid decisions and increase knowledge in the area of housing delivery for Lagos state was articulated.

A pro-inhabitants focus in researching a framework for housing delivery sought to assess both how the inhabitants are affected by housing policy in the infrastructure sector and how greater accountability in service delivery improves the assets and capabilities of the inhabitants. It is envisaged that the findings of the research should enable the voices of the inhabitants to be heard in policy discussions, as well as to ensure that publicly or privately provided services are specifically targeted to their needs.

In the pursuit of the aim of this research the study undertook the following objectives:

(1) Conduct a literature review. The literature review was carried out using electronic databases, searching of national and international journals, bibliographies of relevant papers, citation search, inter-library loan facilities for relevant materials, textbooks and published Ph.D. theses, with the aim of establishing the current body of knowledge on the sustainable housing design and policies giving information and insight into the prevailing problems.
(2) Collect data (the research in the main, adopted a mixed methods approach. The research adopted a pragmatic approach combining both qualitative and quantitative approaches. Prior to the primary data collection phase of the research, ethical approval was sought for and obtained from the University of Wolverhampton's School of Technology Ethics Committee.
(3) Analyze data using various research methodology tools including Documentary analysis of documents, with questionnaire surveys used to obtain data from a large number of participants. Focus group is used to discuss in a purposeful and moderated manner the research topic. The researcher invited the group to attend and explore the provisional findings by describing them to the participants.
(4) Develop a framework that can aid implementation of sustainable affordable housing in Lagos, Nigeria. The relevant information, gathered through the literature search on sustainable housing and design and technology impact from the users viewpoint and their interrelationships, was analyzed, resulting in the development of the conceptual framework. The framework showed how good policy and design techniques could be used to promote better sustainable housing schemes in contracting organisations and other issues that have to be considered such as challenges and negative impacts. In order to fully develop the conceptual framework, an exploratory pilot study was undertaken through semi-structured interviews conducted with housing ministry officials and developers from contracting organisations and analysis of questionnaire results. The qualitative data obtained was analyzed also using thematic/content analysis approach in areas

and the findings were used to refine the framework.

1.05 Broad research questions and hypothesis

Research questions

1. How do the householders feel about the homes they live in?
2. What are the householder's thoughts on government impact on their environment and infrastructure?
3. Are designers driving sustainable construction from inception and impacting housing production?

Hypothesis

The basic hypothesis of this study is that inappropriate housing policies are the major cause of inability to provide shelter for the low income households.

The second hypothesis is that since housing demand is a function of affordability i.e. household income, price of housing, price of all other goods. etc. Low income households have no effective demand for the housing which is being provided under the current policies.

Ecological systems theory impacted the education of disadvantaged and marginalized sections of society. Hence it suits an area requiring sustainable housing in a developed country.
"The ecological perspective uses ecological concepts from biology as a metaphor with which to describe the reprocity between persons and their environments. Attention is on the goodness of fit between an individual or group and the places in which they live out their lives". (Sands, 2001)

1.06 Scope and boundaries of the study

The scope of the research is sustainable housing delivery within Lagos state and analysing the impact and what a good framework can provide within the state. The policies and strategies being pursued by the state will be analysed. The successes and failures will be scrutinized.

The context for the work is to both government and privately owned new build housing projects in Lagos, Nigeria. The combination of housing in Lagos is made up of different owners and users. The reasons for development and housing provision are diverse and so is the source. Majority of the houses in Lagos are built by the individuals in either one units or of twos, fours or sixes. The density of these homes is also quite high

as sub tenants are numerous and it is not unusual to rent an apartment to one individual who then sublets to two others even though this is not normally allowed without the permission of the owner or landlord (Nigeria, 2011). As noted below, Lagos has the smallest land mass in Nigeria and is in a coastal area. The coast limits its expansion southwards which can only be completely achieved by sand filling and building towards the water. Its other outlets go into the surrounding state of Ogun state. The outlets are towards Abeokuta/Shagamu in the North and towards Epe in the East with Badagry/Porto Novo, Benin republic in the Westward route.

This research sought to assess the views of householders in Lagos. It is vital to consult with the existing or proposed users and the study perceived that if there is more consultation with the inhabitants and users of these housing developments, the designers and developers are more likely to provide more sustainable solutions. Also even when they don't get it right if there has been consultation and joint discussions then complaints will be less and the users will be more sympathetic when problems arise. The government policies also need to be current and in tune with the present prevailing problems and not dictated by the previous knowledge of old and outdated issues. If the government claims they are democratic it means these major decisions that would affect people’s lifestyle, wellbeing and livelihood need to be deliberated extensively and ratified by a majority if not all.

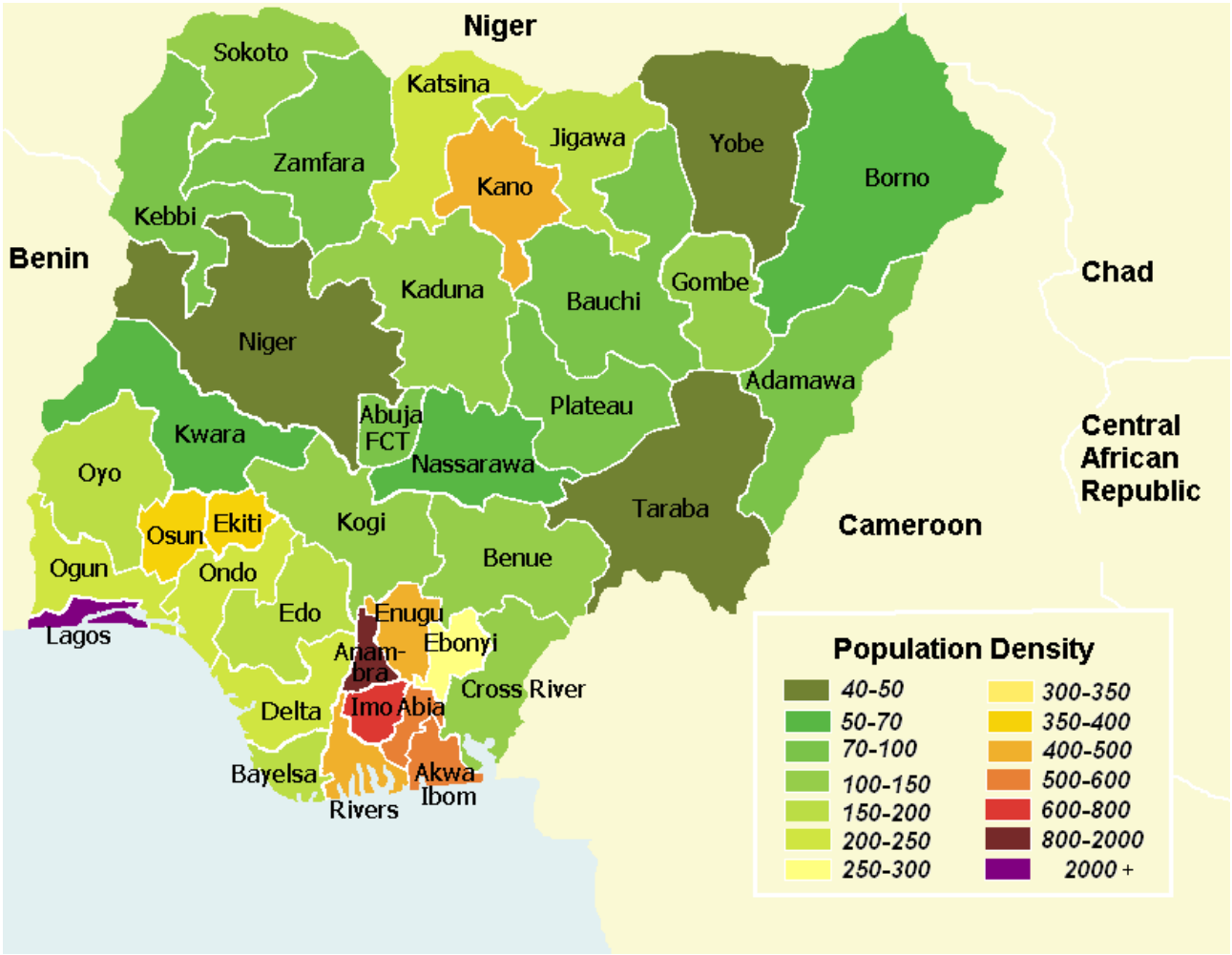


Figure 1.1 Map of Nigeria – highlighting Lagos State

(Kruger, 2008)

1.07 Brief history of Lagos

Named after the Portuguese word for Lagoon, Lagos is a city densely populated and thriving with a mix of arts, culture, people and languages from all different parts of the country. It is the state with the smallest landmass in Nigeria. Land mass of 3,577 sq kilometres and 17, 552,942 inhabitants (2006 Prelim. Census). Population growth of 5% (877,650) persons per annum. UN Habitat 1999 study expects a population of 24.5 million by 2015.

Lagos has been a Yoruba port, a British political centre, and, until 1991, Nigeria's capital. Events in the Nigerian interior propelled the movement of people into Lagos. The impact of the establishment of the Sokoto Caliphate consequent upon the Jihad of Usman Dan Fodio, the displacement of the Egba from their original homes and their founding of Abeokuta together with their pressure on the Yewa and Awori towards

the coast led to an ingress of people into Lagos. (Mandilas Group;, 1999) Lagos has dramatically expanded in terms of population and space being for instance forty times larger than it used to be in 1950 (Davis, 2006).

History has it also that the first known settlement in the neighbourhood before Lagos was Isheri, along the Ogun River. The head of the settlement was known as Ogunfunminire (the god of iron has given me something good) and he was later better known as Agbodere. His title was Olofin. This was a title used by powerful people of those days(Fasinro, 2004).

Through the buildings on the island down the ages, one can glean the history of its past and realise, despite the vicissitudes of change, that Lagos Island has a character all of its own that overrides the resistance to progress, the onslaught of bad planning and the invasion of adventurers. (Akinsemoyin & Vaughan-Richards, 2009)

Lagos, Nigeria's Centre of Excellence and one of the selected seven African Cities designated as NEPAD (New Partnership Aid for Development) City, is unique in many respects. Lagos comprises several mini-cities within the confines of its urban space. (Ministry of Physical Planning and Urban Development, 2006)

In 1960 Lagos had a population of about 800,000, of which only 200,000, were accommodated on the island area to which had been added sand filling of relatively small areas at Offin, Idumagbo, Elegbeta, Odunfa, Onikan/Macgregor canal and Okesuna well before the Second World war. This increased the land mass by about 20%. Ten years later it was already considered too small for further development, and other areas strategic to the balanced growth of the city and its infrastructure were being developed in Ikoyi and on the mainland in the 1950s. These areas were:Ikoyi-for government senior staff and commercial staff housing;Apapa-near the expanded docks, for both commercial and residential buildings;Surulere-for the development of low and middle income group housing;Iganmu and Ijora-for Industrial expansion between Apapa and Ebute Metta;Ikeja near the airport, also expanded together with new government, commercial and residential developments and Victoria Island -for parliament buildings, diplomatic quarters, institutions and offices, hotels and tourism. Also included were the Lagos Island slum clearance and replanning area (started in order to regenerate and expand the business centre of the city) EbuteMetta and Yaba-first developed by Glover and Carter to cater for refugees from the Yoruba wars and for continued development as a middle class residential area with educational institutions(Godwin & Hopwood, 2012).

On Lagos Island, for example, Ikoyi and Victoria Island Districts was prepared by the British Colonial Government and has been in use for over seventy years, while Victoria Island on the other hand was prepared by the Lagos Executive Development Board (LEDB). Overtime, the population of the two districts grew from low density residential to medium and high density residential, thereby exerting pressure on the limited infrastructure within the area. This led to constant breakdown of physical and social infrastructure

leading to shortages of housing, constant traffic congestion, deplorable road conditions, inadequate water supply, increased refuse generation, indiscriminate change in the use of buildings from residential to commercial, thereby reducing the quality of life of the residents in the area(Ministry of Physical Planning and Urban Development, 2006).

In order to ensure compliance with the Model city plan, the following legislative planning instruments have been put in place:
Model City Approval Order
Lagos State Building regulations 2005
Lagos State Physical Planning and Development Law of 2005
Model City Development Authority Law

Table 1.1 The various local government areas in Lagos State

1	Alimosho Akowonjo
2	Agege Sango
3	Ajeromi Ifelodun Ajegunle
4	Apapa
5	Amuwo Odofin
6	Badagry
7	Epe
8	Eti Osa West
9	Ibeju-Lekki
10	Ifako-Ijaiye
11	Ikeja
12	Ikorodu
13	Kosofe
14	Lagos Island
15	Lagos Mainland
16	Mushin
17	Ojo
18	Oshodi
19	Shomolu
20	Surulere

Source: Compiled from (Lagos Bureau of Statistics;, 2012)

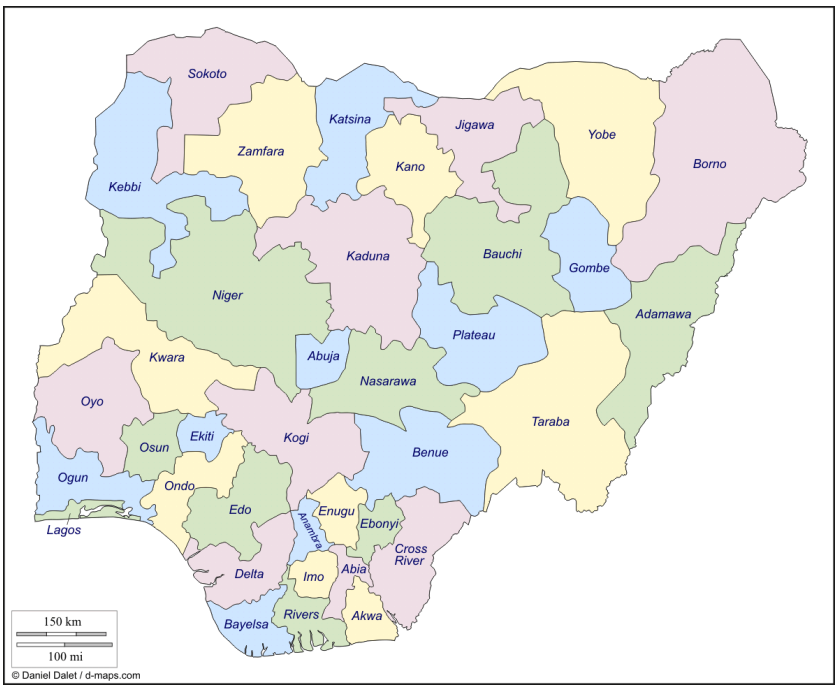


Figure 1.2 Map of Nigeria. Population by State

(National Population Commission, 2013)

Table 1.2 gives us an insight into the population explosion in Lagos which is related to Nigeria over the years the population is increasing at the rate of 3.2% (National Population Commission, 2013)

Table 1.2: Projected Lagos Population 2007-2015

Year	**Population**
2006	17,552,942 Million (Census carried out)
2007	18,114,636 Million
2008	18,694,305 Million
2009	19,292,522 Million
2010	19,909,883 Million
2011	20,546,999 Million
2012	21,204,503 Million
2013	21,883,047 Million
2014	22,583,305 Million
2015	23,305,971 Million

Compiled from (Lagos Bureau of Statistics;, 2012)

Table 1.3: Megacities of the world 1992,1995, 2015

Source (Ilesanmi, 2010)

	Popl. 000s	**Rank**	**Popl. 000s**	**Rank**	**Popl. 000s**	**Rank**	**Popl. Proj. 000s**	**Rank**	**Popl. Proj. 000s**	**Rank**
	1992*		**1995****		**2007*****		**2015****		**2025*****	
Africa										
Lagos			10287	15			24437	3	15796	12
Cairo			9656	19	11893	15	14494	16	15561	13
Kinshasa									16762	11
Asia										
Tokyo	25772	1	26836	1	35676	1	28701	1	36400	1
Bombay (Mumbai)	13322	6	15093	5	18978	5	27373	2	25385	2
Shanghai	14503	5	15082	6	14987	7	23382	4	19412	9
Jakarta			11500	11			21170	5	12363	19
Karachi			9863	18	12130	12	20616	7	19095	10
Beijing	11433	10	12362	8	11106	16	19432	8	14545	15
Dacca			7832	22	13485	9	18964	9	22015	4
Calcutta (Kokata)	11106	12	11673	9	14787	8	17621	12	20560	8
Delhi			9882	17	15926	6	17553	13	22498	3
Timjin			10687	13			16998	14		
Metro Manilla			9280	21	11100	17	14711	15		
Metro Seoul	11589	9	11641	10			13139	18	14808	14
Istanbul			9316	20	10452	19	12345	20	12102	20
Lahore			5085	27			10767	22	10512	24
Hyderabad			5343	26			10663	23		
Osaka	10535	13	10601	14	11294	14	10601	24	11368	22
Bangkok			6566	25			10557	25		
Teheran			6830	24			10211	26		
Moscow					10452	18			10526	23
Guangzhou									11835	24
Shenzhen									10196	25

Chennai (Madris)									10129	26
South America										
Sao Paolo	19235	2	16147	2	18845	4	20783	6	21428	5
Mexico City	15276	4	15643	4	19028	3	18786	10	21009	6
Buenos Aires	11753	8	10990	12	12795	10	12376	19	13768	16
Rio De Janeiro	11257	11	9888	16	11748	13	11534	21	13413	18
Lima			9888	23			10554	25		
North America										
New York	16158	3	16329	3	19040	2	17636	11	20628	7
Los Angeles	11853	7	12410	7	12500	11	14274	17	13672	17

Table 1.4: Megacities of the world

Source: Adapted from Table 1.3 above

No.	**City**	**Population projection in 2015**	**Population Rank projection in 2015**	
1	**Tokyo**	28701	1	
2	**Bombay (Mumbai)**	27373	2	
3	**Lagos**	24437	3	
4	**Cairo**	14494	16	

1.08 Appropriate comparative cities

In highlighting the megacities of the world with a very high and growing population, Lagos is ranked to be the 3rd by the year 2015 as noted in our table 1.4 above. A brief summary of other comparative cities like Tokyo, Bombay (Mumbai) and Cairo with a similar high population is noted below.

Tokyo

A well populated town with well developed infrastructure serving as a big attraction to all the populace in the hinterland to come. Greater Tokyo is the world's biggest city with a population of over thirty five million people a quarter of Japan lives here. The city spreads over an area of 90km from east to west (Solesbury, 2013). Tokyo is suffering the fruits of its advancement as inflow from other less successful towns into it is making it struggle to cope. It's however still one of the most attractive cities to live in.

Japan has his own meaning of welfare distinguished by an emphasis on family as a safety net to limit poverty and dependency.

There is an imbalance in housing allocations amongst different groups, largely favouring those who are deemed as important to the growth of the economy - working families (Tang, 2007).

Bombay (Mumbai)

This is a city bristling to the brim. The Modern chronicler of Mumbai life, Seketu Mehta calls it "Maximum City" There is a population of 20 million that maximises the impact and justifies the name. There are an average of 27,000 people per square kilometre (In New York they have 9,500 per sq km, in Mexico nearly 6000 per sq km) In parts of central Mumbai population gets up to 100,000 per sq km (Solesbury, 2013).

Bombay is typically characterized as India's most modern city. In view of its range of manufacturing, finance and service activities Bombay has been described as the first India town to experience economic, technological and social changes associated with the growth of capitalism in India (Patel, 2004)**.**

Cairo

Cairo, as many other cities in developing countries, has gone through three main phases of transformation which have moved it from the deep-rooted practices of traditional housing processes to the current, chiefly western-inspired, examples. These phases are westernisation, colonialism and modernism. Each of these phases has moved the urban form and process away from its origins, but the greatest influence has been through adopting modernism (Khaled, 2014).

Typical public housing in Egypt has always had the stigma of inflexibility and lack of adaptability for the varying and changeable needs of the user. Production of cheaper housing in short periods and large quantities

has always been the main goal of the mass housing programmes in Egypt. This automatically led to the construction of small identical housing units in five-storey 'walk-up' type blocks of flats (Kardash & Wilkinson, 1993).

Figure 1.3 below further highlight the rapid growth of Lagos in particular within Africa as one of the fastest growing cities.

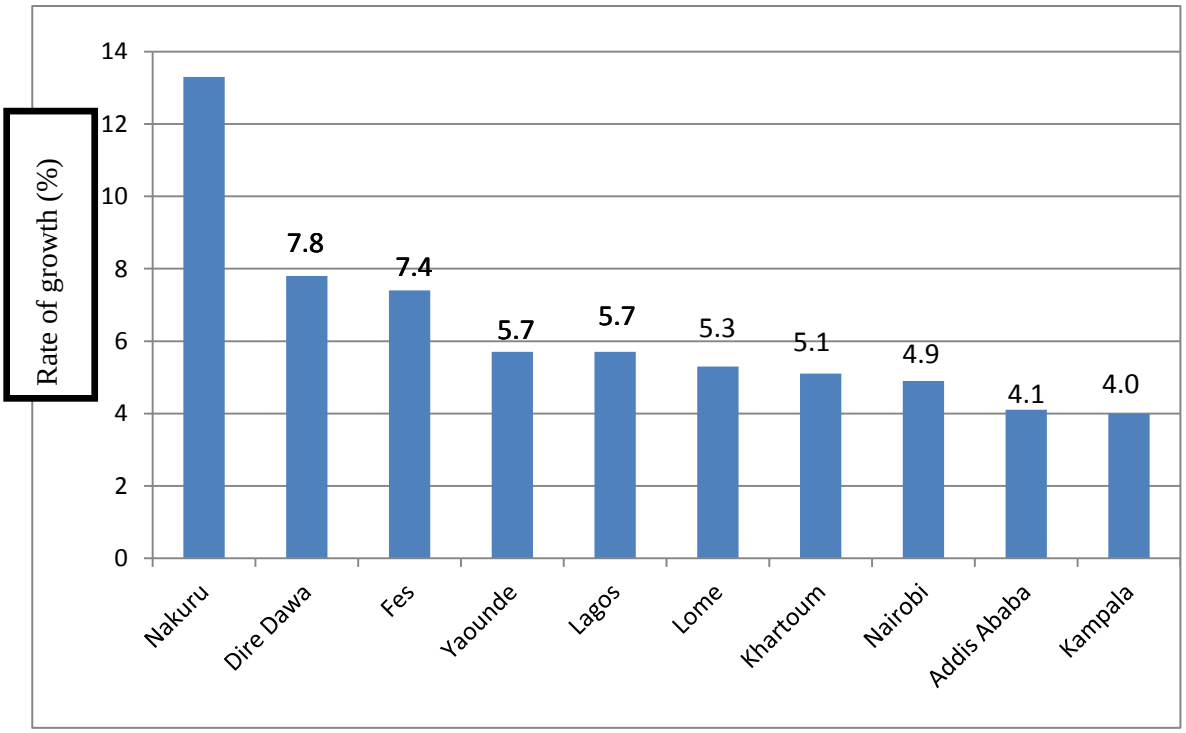


Figure 1.3: Average annual growth rate of selected fast growing cities in Africa 1990-2006
(UN Habitat, 2010)

1.09 Limitations of Study

Some limitations were identified in the pursuit of this research work. These included the inability to obtain concise and up-to-date data from government departments and housing developers. Housing need is the extent to which the supply of adequate housing falls short of the demand of households and individuals. To evolve a good housing policy and programme, it is necessary to establish the need. (Onibokun, 1990). Another limitation was determining who the locals in Lagos are, as Lagos extends into the neighbouring Ogun state on all its boundaries except two which are to the Atlantic Ocean and to border side of neighbouring country Benin. (Figure 1.2) What is local and how do we determine local is it by living there, or working there or by having a strong local association? How do we prevent resale to outsiders of housing originally allocated to local people? (Dunn, et al., 1981).

There is no up-to-date census however the National Bureau of Statistics has been a source of useful information. The different parastatals have not kept as accurate a record of their work or involvement as would be expected in a state with such a large number of people and resource. It is said that the people are weary of being counted, as they may be asked to account for unpaid tax.

1.10 Delimitations of the study

The research focused on Lagos state area, being the most populated state in the country of Nigeria and having the biggest housing problem. The research is aimed at sustainable housing and not primarily affordable housing. There is a large population in Lagos involved in this deficiency therefore the topic is pertinent to the lives of many. The need for better sustainable housing is high and the provision is low comparatively. Rising land prices and charges appear exorbitant and much above the official income capacity of many Nigerian professionals (Enisan & Ogundiran, 2013). With the vast population in Nigeria, it was sensible to select the city with the largest population as a good identifier to study and elicit any further information to buttress the need for further sustainable housing in the country. The high density in Lagos is synonymous with the highly populated areas in Nigeria and simulates all the major problems encountered in those areas. Lagos issues are further exacerbated by the lack of good infrastructure which has been a consequence of mismanagement of limited resources. Finally there is the need to narrow down from such a broad topic to contribute effectively to the existing body of knowledge.

1.11 Significance of the study

This study is theoretically and geographically significant in many respects and could hopefully contribute to the process of providing sustainably designed homes that will more readily reflect the occupant's requirements.

The study will aim to contribute to the growing debate on defining the most suitable framework for sustainable housing delivery for many sub-Saharan cities. Many of these cities are confronted with the dilemma of implementing market-driven economic reforms in all sectors including housing on the one hand and also the task of ensuring that every citizen is given equal access to housing opportunities on the other. Also modern design, construction and operation practice is still, therefore, very much handicapped by the poor assessment of building design, insufficient use of appropriate assessment methods, problems with access to relevant data and lack of competence in making sustainable decisions (Huovila & Curwell, 2007).
The need for shelter is a fundamental human requirement and the quality and availability of housing affects all of us. However 'housing' is not a single entity; it is a heterogeneous item, available in many different

locations, in different sizes and styles, of variable quality, and in a number of distinct tenures. (Harriott, et al., 1998).

The initial literature review proved fundamental to the direction taken by this research. Despite sustainability being acknowledged as crucial in reducing the maintaining and running costs of these projects, it is clear that it is not being properly addressed due to the perceived extra costs. (CIEF, 2005)
A gap was identified in the literature review between policy and practice in the delivery of sustainable housing projects in Lagos, Nigeria. It was important to feel the heartbeat of the people, what they wanted, how they wanted to live, how they had been living. In part, people have been put off from getting involved because planning policy itself has become so elaborate and forbidding – the preserve of specialists, rather than people in communities.(Clark, 2012). Sustainability as a concept attempts to achieve, simultaneously, the goals of an improved environment, a better economy, and a more just and participative society, rather than trading off any one of these against the others. (Newman & Kenworthy, 2003). While its primary context is global, sustainability is seen to be meaningful when it is practiced through local initiatives with global significance. In its application to cities, sustainability adopts the metaphor of metabolism; a city can be defined as becoming more sustainable if it is reducing its resource inputs (land, energy, water, and materials) and waste outputs (air, liquid, and solid waste)while simultaneously improving its livability (health, employment, income, housing, leisure activities, public spaces, and community) (Newman & Kenworthy, 2003). However, it is important to remember that turning enabling policy into effective practice requires far-reaching changes involving a complex combination of development actors who bring their own perspectives on participation to bear on attempts to close the gap between principles and reality, and that between the potential for action and the concrete activities (Cornwall, 2002).

The different ways in which housing procurement is delivered by different developers and the question of how high on their agenda sustainable issues are has been identified as an area of research need. Also, whether any price or sustainability analysis is completed prior to deciding on what materials or methods of construction to use is not clear.

1.12 Sustainable Urban Design

Poor design and construction methods have a significant effect on health and on the environment. Sustainable urban design is essential in order to ensure that urban settlement patterns take account of environmental factors. It must encompass the integration of urban environment issues at three levels: in the most relevant community policies (transport, health, research and technological development), in key sectors of community environment policy (water, air, noise, waste, nature and biodiversity) and between the different levels of administration (national, state and local).

It’s important to note that smart redevelopment strategies can boost economy and living quality. The sustainable city is not rooted in an idealised version of past settlements nor is it one given to a radical casting off from its own particular cultural, economic and physical identity in the name of the latest passing fad for urban change (Haughton & Hunter, 1994).

The industrial revolution marked the transition of sectors that were limited by the largely manual exploitation of renewable resources in a relatively sustainable way to the use of solar energy embedded in fossil fuels (coal, oil and natural gas) (Robinson, 2011). Building orientation and massing have significant influence on the energy used by the unit even before any energy efficiency measures are incorporated into the design (Farr, 2008).

Sustainable construction strategies are of great importance. In the housing unit, lead exposure, poor indoor air quality and contaminated construction materials are some of the health risks (Lawanson T. , 2006). More are aware of the impact of sustainable design on the urban and rural footprint, however many are unaware of the ways to get maximum benefit from the various policies being heralded by the legislature and government. The correlation between policy impact and environment needs to be addressed strongly and brought to the fore in the public arena. It is essential that decision makers and the voters alike are briefed properly about the dangers of not factoring in key sectors in the policy formulation appropriately. The Lagos State government should ensure that environmental remediation costs are built into any development projects (major or minor) (Oyefara, 2013).

Since the summits that have occurred recently, such as the Rio declaration in 1993,international concern has grown and given birth to various bodies targeted at reducing the negative environmental impact of buildings on the environment. There is a debate underway about what planning route to take to achieve this urban design.

With rapid urban growth there is a danger of urban planning becoming chaotic and not properly directed towards accommodating the upsurge in population. Slums have increased rapidly in size and number in the cities, and people are living well below the poverty level in city areas on a meagre dollar a day. This is insufficient to cater to the daily need of a person, let alone a family. According to UN estimates, in the 50 year period between 1975 and 2025 alone the global level of urbanisation will have increase from 37.7 to 61.1% and the total population living in cities will have risen from 1.58 to 5.06 billion. An annual urban growth rate over the period of 2.38% (Burgess & Jenks, 2000). There is a long history of views on the appropriate form of urban development. Throughout the 20th century, these views have been polarised between clear decentrist and centrist camps. From the turn of the century onwards, factions have tended to rally round and elaborate on the classic stances of Howard, Wright and Le Corbusier. A clear lineage can be traced for each of the camps through the late 1960s and 1970s. Big ideas became less popular went out at

that time. Now that a "big problem: sustainable development, big solution: compact city" has emerged as a model, the debate has been revived (Jenks, Burton, & Williams, 1996).

There is a strong link between urban form and sustainable development, but it is not simple and straightforward. It has been suggested that a sustainable city must be of a form and scale appropriate to walking, cycling and efficient public transport, with a compactness that encourages social interaction (Elkin et al 1991 p. 12).

It is not only absolute densities that vary in different urban contexts: spatial patterns of density and socio economic characteristics within cities vary between developed and developing countries too. In developed countries, the urban poor and those on low incomes tend to live in the centre, and the rich and middle class on the periphery, in the suburbs. This is very different in developing countries. The poorest people still tend to live in the centre, but are already accommodated at very high densities. However there are also clusters of poorer people on the periphery, often in low and medium density squatter settlements or illegal subdivisions (Williams K. , 2003).

Sustainable development is an imperative if the dire consequences of global warming are to be ameliorated (Jenks, Burton, & Williams, 1996). This research will endeavour to design a framework to assist the key stakeholders in procuring sustainable housing to the deserving numbers that wait.

1.13 Publications

Olagunju, Olatunji; Oloke, David; Hammond, Felix; Costello, Pat (2011)'Framework analysis of technology and design of sustainable affordable housing in Nigeria Proceedings of 3rd West Africa Built Environment Research (WABER) Accra, Ghana, pp. 487-499.

Olagunju, Olatunji; Oloke, David; Hammond, Felix; Costello, Pat (2011) 'Role of Policy development and implementation in the creation of sustainable affordable housing in Nigeria'RICS International Research conference Manchester COBRA

Olagunju, Olatunji; Oloke, David; Hammond, Felix; Costello, Pat (2012)'Impact of Policy development and implementation in the construction of sustainable affordable housing in Lagos, Nigeria'17th international symposium on advancement of construction management and real estate Shenzhen, China

Olagunju, Olatunji; Oloke, David; Hammond, Felix; Costello, Pat (2013) 'Design and technology and its sustainability impact on affordable housing production in Nigeria' 6th ARCON Architects Colloquim Abuja, Nigeria.

1.14 Summary

A framework for sustainable housing delivery is the focus of this research, ensuring that the deficit is reduced for Lagos state indigenes. The proposed framework will analyse the various variables and facilitate the redefining of recent applicable housing policy to permit swift shelter and infrastructure provision.

One of the objectives is to inquire if it is sustainable or achievable on a long run to provide housing that would not be destructive to the environment in the future and would also serve the government goals of improving the living conditions of the populace within a reasonable period. The way in which the research has been undertaken is outlined and goals are crystallized, obstacles are identified concluding with the significance of the study. The significance would be to contribute to the process by developing a delivery framework that can be fine-tuned using up-to-date information to design and build homes that will reflect user's needs and are cost effective and quick to produce. A comparative analysis is also highlighted of similar cities to Lagos and housing issues faced. Sustainable urban design and construction strategies are also enumerated.

1.15 Structure of the Thesis

The thesis comprises nine chapters as shown in Figure 1.1. The first chapter gives an overview of the research. It commences with a background to the research and highlights studies undertaken on the application of sustainable housing, noting the knowledge gaps. This is then followed by the research aim, objectives, scope of the study and a brief description of the research methodology adopted.

Chapters Two and Three review the literature with an Overview of Housing – A focus on Nigeria-Housing Delivery, Challenges and Opportunities, Partnering and profiting. Chapter Three continues with the desk top study and literature on Design, technology and sustainability of housing in Lagos. The principles and tools developed to aid further efficient production of housing by the construction industry were also discussed in these two chapters. The chapters, therefore, tease out the potential relationships between design, technology and housing issues in Lagos and bring together all the essential aspects to initially conceptualise the mechanism by which housing construction techniques could be used to promote better housing. As part of the conceptual framework, it presents an interaction matrix of the relationships between design, technology and housing production issues.

Chapter Four showcases the research methodology used. In this case, it discusses the qualitative and quantitative approaches adopted in the study, stating reasons why the sequential mixed method approach was adopted. It demonstrates how the data was collected and analysed to address the research objectives.

Chapter Five is the pilot study which was initially completed to elicit from key personnel the cogent issues, questions and policies driving housing production in Lagos state. It also discusses the case studies and the challenges and opportunities that can be seen.

Chapter Six presents data collected and collates it in a format for further analysis and assessment the findings of the quantitative study are undertaken to test the relationships identified in the developed framework and other components of the framework.

Chapter Seven presents a qualitative assessment of the case studies including government assisted developments in the various areas of Lagos State. It also looks at private sector initiatives, strategies for encouraging public private partnerships (PPP). It presents progress on existing PPPs. Mortgage and government housing provision is also discussed.

Chapter Eight presents the outcome of the study in the form of an integrated framework. It

discusses the different components of the framework and how it could be used by stakeholders to promote sustainable housing. The Chapter also presents the validation of the research findings and the focus group discussion and results are highlighted.

Chapter Nine gives an evaluation of the relevance of the framework in promoting affordable sustainable housing from the users' perspective. It gives the limitations of the study and its contribution to knowledge. This chapter also discusses the findings across each chapter, and draws conclusions of the study making recommendations for policy and practice as well as areas for further extension of the research.

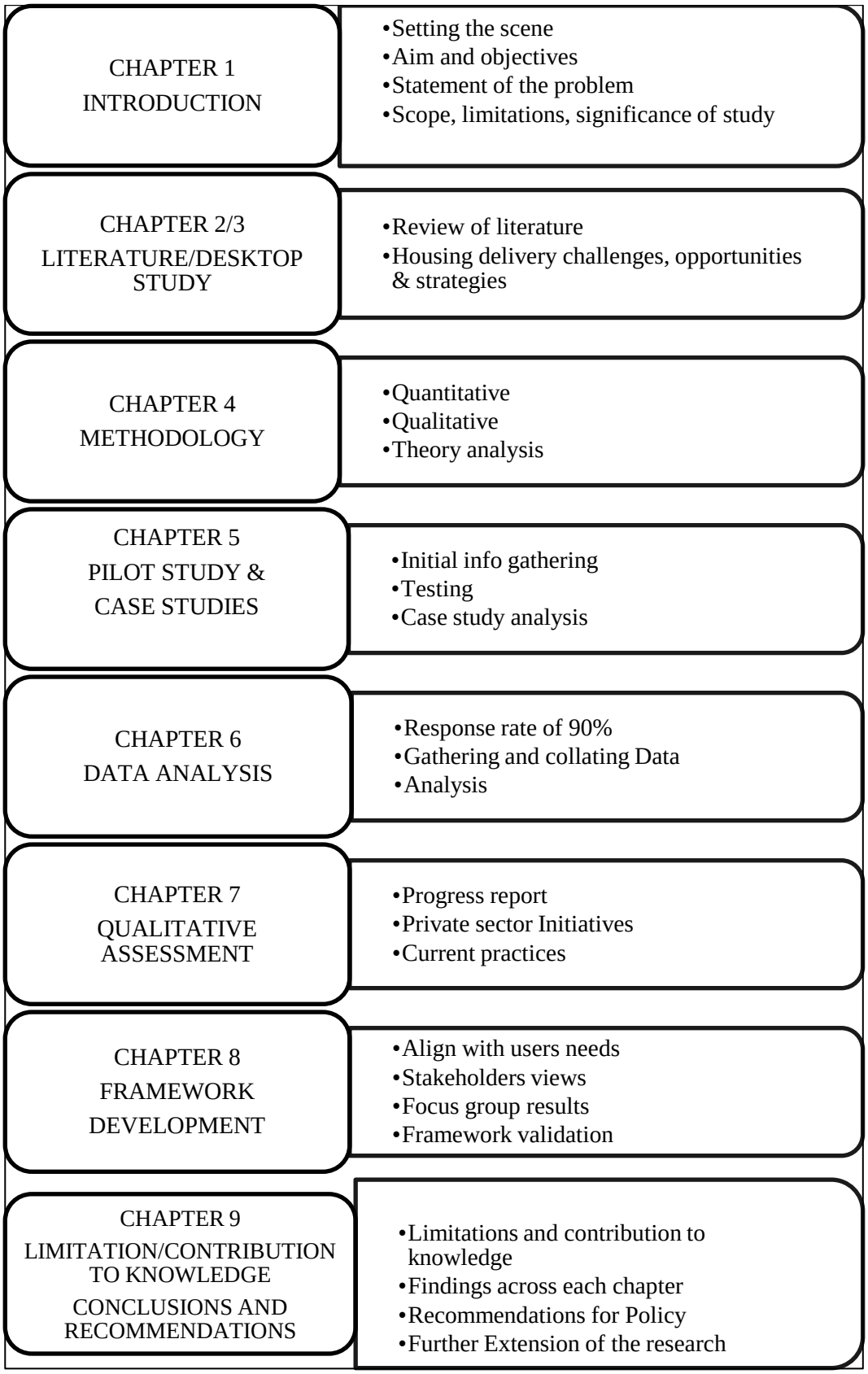


Figure 1.4: Structure of the Thesis

CHAPTER 2: OVERVIEW OF HOUSING

2.00 Introduction

A holistic approach is adopted in this research as a means of ensuring a useful outcome that recommends techniques that are deliverable at a reasonable cost both financially and environmentally. Architects should be at the forefront of this, as they would be immediately involved from inception. The planning design and specification of the housing units will determine the materials to be used and the procurement methods to be utilized.

Housing delivery systems have been classified as developmentally-orientated or conventionally-orientated. It has been claimed that a developmentally-orientated approach to building procurement would encompass the parameters of community empowerment and participation in design, job creation via the development process, and economically and environmentally-sustainable procurement. (Taylor & Norval, 1994) However, especially in upcoming developments in Nigeria, new building procurement systems display an increasing awareness of sustainability, but concentrate on economic and social sustainability, as opposed to environmental sustainability (Dalgliesh, et al., 1997). It can be reasoned that due to the state of the economy and the need to redirect the resources judiciously, the tendency is to target housing and the social development. Many of the state and federal government focus on what is perceived as important to the populace to the detriment of the environment, which can have a negative repercussion on the future of the people. It would be useful to note that it is not just lip service that has been paid to the topic of sustainable environmental development, but that resources are genuinely earmarked for it.

2.01 Housing Delivery Challenges and Opportunities

Production of housing is normally quite damaging to the environment if it does not use locally available materials that are also sustainable. A major aim of sustainable housing must be to exploit all viable opportunities to recycle and reuse products and buildings in order to reduce production in the first place. It cannot be stressed too strongly how important it is to look at each housing development's potential for efficient and responsible resource use within its own unique and local context (Williams & Stevenson, 2000).

The administration embarked on urban renewal programmes to meet the challenges of Lagos' Mega City Status, and as well fulfil the administrative promises to Lagosians and Nigerians in general. Key administrative' policies include:

1. Zero-tolerance for lack of discipline in the state,
2. Adequate security of lives and property,

3. Maximum use of tax resources of Lagos State,
4. Urban renewal and environmental protection through “Operation Green Lagos”,
5. Public-Partnership Programmes in health, environment and transportation services,
6. Free education policy of Lagos State Government,
7. Modernization of the services of the informal sector,
8. Expansion of democratic space for Lagosians through constituency meetings and the new rotational policy of the State House of Assembly,
9. Land reforms, which include prompt issuance of Certificate of Occupancy to private individuals and as well as corporate organization, and
10. State Judicial Sector Reforms such as quick dispensation of justice by all cadres of members of Lagos Judiciary (Oyefara, 2013).

To start off projects in the local areas, initiatives at the neighborhood level supported by changes in the enabling environment are required. Changes such as housing finance policies and mechanisms that channel resources to the informal private sector for the provision of housing and access to land for low-income housing by individuals and small-scale developers and private entrepreneurs (Ogu & Ogbuozobe, 2001). Also required are planning and building regulations, and building materials to facilitate the production of new low-cost and low-income housing units. The revised building code also has to drive the need for a sustainable development by making it essential for all new housing developments and refurbishments of housing especially to be built with this as an integral part of the design and build method statement.

Population increase and city conditions led to an expedited demand for new buildings, and concentrated stance on the importance of local building materials and techniques. In many parts of the world, such materials and techniques are widely used and help meet the growing demand for low-cost housing. Methods of improving such materials and technologies and for combining them in new ways are constantly being developed (Gentileschi, 1999). The methods as adopted should be relative to what is available or easily accessible in terms of skills and materials in the immediate vicinity.

Literally, housing, is defined as buildings or other shelters in which people live, a place to live, a dwelling etc. Formations, it is a critical component in social and economic fabric. Housing represents one of the most basic human needs. As a unit of the environment, it has a profound influence on the health, efficiency, social behaviour, satisfaction and general welfare of the community (Onibokun, 1990). Housing has come to mean different things to different people depending on their need. For some it is just a place to lay their heads for the night, away from the vagaries of the weather. While for others it is more than that: it is home, it is a place of solace, of comfort, of love, of long standing deep memories. How we treat our homes or houses is therefore a reflection of what value we place on them. In Lagos, the location can be the determinant for

desiring a particular home. The impact of location in housing market is very significant. Since housing units are fixed in location, they differ in terms of their surroundings, the kind of community in which they are located, and their proximity to employment and shopping places. Locational area also means that a dwelling's surrounding is possibly of great importance in affecting its value (Aluko, 2011).

2.02 Building Materials Usage

Locally available materials are more commonly utilized in the rural areas, as the knowledge and skills have been passed down over the years to local artisans. The artisans have been able to hone their skill due to demand from the locals. However, it seems this is a dying trend which is influencing the quality of build and therefore owners and house builders are shying away from the local methods. The demand is now for cement block production for example in the rural area instead of using clay. The rural form of construction and building material is being replaced by the modern form of unsustainable material (Ajanlekoko, 2001)As one travels the landscape its poignant to see that the houses sit incongruously in their setting as where mud huts with thatch roofs are expected but rather concrete block walls with aluminium roofs or mud huts with aluminium roofs are prevalent. The detailing and construction method is not suitable to the environment, its makeshift, non-recyclable and non-reusable.

Environmental sustainability or affordable housing; can we ever have both? The elements of the answer to this question were examined critically. These included: 1.) If we have housing provided for the different levels of affordability we would likely have mud huts and thatch roofs in the rural areas for majority of the inhabitants (Adebayo, et al., 2010) 2.) We would improve on the design and the production, as we do this its more attractive and available to the users. 3.) The prices would be reduced as the means of production gets fine-tuned and possibly mechanized for quicker production. For example the mud huts are made with mud bricks to a certain size, quality and consistency. This is made to match the right sized timber wall plate which is connected to the timber rafters and is roofed with the thatch. Proper wall and window insulation to prevent heat gain is incorporated in the mud walls and timber windows.

The debate is inconclusive on whether poor families often lack the resources to avoid degrading their environment. The very poor, struggling at the edge of subsistence, are preoccupied with day-to-day survival. It is not that the poor have inherently short horizons; poor communities often have a strong ethic of stewardship in managing their traditional lands. However, their fragile and limited resources, their often poorly defined property rights, and their limited access to credit and insurance markets prevents them from investing as much as they should in environmental protection (World Bank, 1992). In the mid-1980s, it was suggested that 57% of the rural poor and 76% of the urban poor were resident in areas where ecological destruction and/or severe environmental hazards threatened their well-being. Also see poverty and environment connection chart. (Leonard, 1989) Developing countries are, by definition known for their lack of economic resources, or the under-utilisation thereof. Therefore most affordable housing schemes are

located in areas of poor economic conditions which ultimately influence the housing policy. (Mohlasedi & Nkado, 1997)

The quality of housing produced is as important as the number. Our past and current housing programmes have not paid adequate attention to quality and other related aspects of good housing such as comfort and aesthetics. Need in housing involves more than sheer numerical strength of physical structures. It should also be seen in terms of design, type, location - fundamental physiological needs. The architects of our housing programmes, particularly those of low income housing, have not adopted the broad interpretation of housing needs. Nigeria is a multicultural country. With more than 250 ethnic groups, we should expect a great variety in housing needs. (Onibokun, 1990)

Local materials are usually the most common, used because of the greatly reduced energy needs in transportation. One example of sustainable construction materials is adobe. In West Asia, North Africa, West Africa, South America, South-western North America, and Spain adobe is used to construct all kinds of buildings. Not only is there almost no energy consumed in transportation, but the material is found everywhere. Many people simply use the adobe found right on the land where they are building. One does of course need a frame for support, but the adobe mixture is very strong and the home is somewhat naturally insulated because of the thickness of the walls and the density of the adobe itself. Building a sustainable house begins a long time before the foundations are laid. Choices about where to build and what to build with will impact on the costs, the family and the environment. When building the home, issues of sustainability should be considered (Brisbane city council, 2005). Once the home is built, the occupants will find lowered electric bills and less energy consumption than their neighbours who may not have used sustainable building materials, or indeed may not have sustainable homes.

As the world continues to urbanize, one of the most notable by-products of the urban lifestyle has become the amount of waste generated, especially municipal solid waste (MSW). A decade ago, there were 2.9 billion urban residents in the world, who together generated about 0.64 kg of MSW per person per day. Today, there are estimated to be 3 billion urban residents generating 1.2 kg of MSW per person per day. By 2025, the World Bank estimates that there will be 4.3 billion urban residents generating 1.42 kg of MSW per person per day. During this period of time, the total quantity of MSW from urban residents will have increased from 0.68 billion tonnes to 2.2 billion tonnes per year (Environment Bureau, Hong Kong, 2013).

Historically, development in Lagos has become chaotic with the change in governments from Military rule to democratic power. In the 50 and 60s, the population was not so high and there was a degree of structure initiated by the Public works engineers. However the growth and population density soon overwhelmed the infrastructure and rendered it inadequate. In the 50 and 60s water, could be drunk from the tap and tasted good: the pressure was high, particularly on the island where a 40-foot head was maintained. With more users and less supply, the 60s saw a steady deterioration in water supply in spite of World Bank projects and the construction of mini water works in the residential areas (Godwin & Hopwood, 2012).

Sustainable building materials that are not made from recycled sources must be highly renewable. Straw, adobe, hay, bamboo, cork, and clay are all considered sustainable construction materials because of their abilities to renew quickly when harvested, low or no emission rates, and their energy conservation qualities. They are all natural materials that can be used in sustainable development to build healthier, more eco-friendly homes. Recycled materials include anything from steel, to granite, to polyurethane. No matter what kind of building is being constructed, sustainable materials will make the job easier on the environment as well as the occupants of the building. Most of these procedures cost the same or less than more traditional ones. In the rare case that they are more expensive, it is usually worth the extra cost needed. In general, we find that projects with budgets set without reference to sustainable goals are still achieving certification with little or no adjustment to their budget. (Morris & Matthiessen, 2007)Sustainable Design often incorporates the proper placement of windows to allow the maximum benefit of the sun to conserve energy. Sustainable windows can be made from recycled or reclaimed glass. Energy Star has ratings for windows to help the builder or homeowner find those that help reduce electric costs the most. It is important to make sure windows fit securely into the frame, eliminating the possibility of lost heat or air conditioning through cracks. Frames can be made of sustainable materials such as recycled or reclaimed wood, making them as eco-friendly as the window itself. When applying sustainable design the lighting in the home should be environmentally friendly. Strategic placement of windows will allow natural sunlight, but the inhabitant will still need to produce their own at night or on dark days. Solar lighting is an excellent option for many people. Using new LED lighting technology and bulbs to illuminate the home will cut back drastically on the amount of energy a home uses for light. In a world where global warming has become a significant environmental issue and a primary societal concern, the safe and reliable production of nuclear energy is an excellent alternative to the combustion of fossil fuels (Michaelides, 2012).

Sustainable buildings are becoming popular. Homes are now constructed out of rammed earth, adobe, bamboo, straw, and any number of similar materials. The knowledge and variety of sustainable materials that can be used to insulate the home is increasing. We should improve our know-how about building materials including windows and cabinets, with consideration also given to living walls. All of these parts of the house can be made sustainable and eco-friendly with little effort and often at the same or close to the same cost as materials that are more conventional. With the dropping prices and increased options and efficiency, there is very good reason to use environmentally friendly building materials in our home. Designers and builders can work with energy of the sun, natural light, ventilation and the insulation of the earth to make houses more energy efficient (Steven Winter and Associates, 1998).

2.03 Environmental Conditions in the Lagos Metropolis: An Overview

The conditions in Lagos now is getting worse and worse as their does not seem to be a coordinated plan for eradicating the squalor in the city. The high population density highlights the weakness of the infrastructure and the apparent lack of it.

The city is especially vulnerable to flooding and storm damage. The poor are most affected because they live in ecologically vulnerable areas, such as Ajegunle, Makoko, Iwaya, Ijora Badia, Oshodi and Mushin. Air pollution is caused by the use of kerosene, firewood and coal for cooking, fumes from motor vehicles and generators and industrial effluents. The use of electricity generators involves burning fossil fuels, which apart from causing noise pollution, releases greenhouse gases that leads to global warming and eventually depleting the ozone layer, causing climate changes, rising sea levels, changes in vegetation, and severe weather events (Lawanson, 2006).

Table 2.1: presents a brief overview of the environmental conditions prevalent in the Lagos Metropolis at household level

Table 2.1: Environmental Conditions in the Lagos Metropolis

HOUSEHOLD STATISTICS	Average Household Size	6.2
	No of Households per Building	8
	Households living in one room	75%
HOUSEHOLD FACILITIES	Kitchen, Bath and Toilet	10%
	Kitchen and Toilet	15.3%
	Kitchen and Bath	14.7%
	Bath and Toilet	21.5%
	No Kitchen, Bath and Toilet	38.5%
SOURCE OF WATER SUPPLY	Pipe Borne Water	10.5%
	Public Tap	14.3%
	Surface Well	55.3%
	River	4.0%
	Water Vendor	15.7%
TOILET FACILITIES	Septic Tank	10.0%
	Pit Latrine	55.5%
	Pail Latrine	32.5%
	Bush	2.0%
WASTE DISPOSAL METHOD	Government/ LAWMA	6.3%
	PSP/ Highway Managers	10.6 %
	Burning	10.7%
	Scavenger/ Truck Pushers	69.5%
	Burying	3.1%
ENVIRONMENTAL CONDITIONS	Derelict/ Near Derelict Houses	56.1%
	Dirty/ Degraded Houses	51.9%
	Non Ideal Waste water disposal	11.5%
	Non Ideal Human Waste Disposal	48.2%

(Lagos State Government/ UN-Habitat Office in Nigeria, 2004)

2.04 History of Sustainable housing production in Lagos state

Lagos has a long history of efforts by the populace and government in providing and increasing the number of housing units for the masses. The production of housing has been a perpetual problem that all arms of government have tried in vain to resolve. The thinking in the past and at present is that because the government can command more financial resources and executive powers than individuals and corporate bodies, it should go into direct house construction. However, given the negative results of direct construction by both the federal and state governments (especially during the third plan period), manifested in the extremely high cost and slow pace of construction, the governments direct home construction strategy has not been in the nation's best interest. Houses built by government are much more expensive than similar houses built by non-governmental agencies and individuals. (Onibokun, 1990)Various organisations have come forth with different schemes aimed at alleviating the huge problem faced. This dates as far back as the mid 1950swith the Lagos executive development board. (LEDB) LEDB was able to deliver 4,502 Housing units within 17 years from 1955 to 1972 when it was dissolved with the population rising from 1.4 million in 1963 to 3.5 million in 1975. In 1972, the functions of LEDB were transferred to Lagos State Development and Property Corporation (LSDPC) as the sole agency responsible for the provision of housing in Lagos state. Since its inception in 1972 LSDPC has been saddled with the execution of gigantic low-cost housing program of the early eighties which yielded close to 10,000 units. In 1979 under the leadership of Alhaji L.K. Jakande, LSDPC took a dynamic and elaborate turn with emphasis on low cost flats to cater for the needs of the low income earners. The government realized that only the supply of housing units on a large scale either through government or by individuals themselves can reduce the chronic shortages (Oshodi, 2010).

2.05 Previous methods and present methods

Housing delivery in the past was sufficient to alleviate the need as the population was not as high and demand for housing was not so great. In the 1950s, as discussed above, the rural to urban migration was reduced and there was a growth in both areas, however it seems the perceived growth is only in the cities hence the negative migration to an area that can't sustain the influx. Although rural to urban migration is not the only, nor necessarily the main cause of urban population increase, it is often singled out by policy makers as a major concern, and the main contributor to urban problem. (Nkwogu, 2001). Also in the past prior to the colonial period, many methods of housing finance were adopted in different parts of the country. Amongst these are Esusu and Ajo, Age grade association, village development scheme and town unions of people living outside their place of birth. (Nubi, 2006) However with the explosion in population in Lagos state especially as noted, it is imperative that the strategy needs to change to match

the need. The cities are not equipped to cater for the number of inhabitants that are thrusting themselves into its care. The government needs to create the awareness and the positive environment in the rural areas to stem the tide. As long as the inhabitants feel the grass is greener on the other side they will continue to escape from the villages and rural areas to the towns.

Present methods that could be adopted by the local government would include providing better schools, health centres and finance for agricultural projects. This can be completed by enlightening the locals through education, proper skills transfer and financial education and planning. These would ensure that families will be committed to the land and the area where they are as this would be their source of livelihood and going elsewhere would not be an option. The illusion and myth that going to the big town would guarantee a better life needs to be eradicated from the minds of the local people and emphasis giving to the benefits in the local area.

Its noted that the new Lagos HOMS (Lagos State Home Ownership Scheme) is setting a standard and encouraging other states to follow suit. The home ownership shortfall is high. There is a demand of over 17million homes in the country and the government is going a very small way to achieve what it wants, by providing 3,156 at various stages. The statistics are not clearly defined; however the shortfall is obvious in every state and local government, especially Lagos state as it is the most densely populated. (Lagos State Government/ UN-Habitat Office in Nigeria, 2004) It is envisaged that there would be over-subscription for the units being built, as the demand far outweighs this supply. However, it might be argued that the government making the initial effort would encourage developers to also team up with them to build more, better and faster,

2.06 The Land Use Act

The Land Use Act has been in place for many years, and some have argued that it is the core of the problems we have with the disposal of land and freedom to own and to part with. The act has not succeeded in making land readily available to Nigerians because the process of accessibility to land is long, tortuous and expensive (Aluko, 2007).

The law regulating use and management of land in Nigeria was changed to the Land Use Act in 1978 consequent upon which the Right of Occupancy became the only permissible and recognized land right existing in the country; evidenced *vide* the issuance of Certificate of Occupancy by the Governor.

Although the Land Use Act recognized the continued existence of prior land rights and epitome of title, their continued existence is subject to the provisions of the Land Use Act. This recognition has led to the growth of parallel land titles competing for relevance and recognition with the Certificate of Occupancy provided for under the Act (Otubu, 2013).

The Land Use Act is more than a legal parchment. It is above all a social document in line with the fundamental objectives and direct principles of state policy set out in the Nigerian constitution. It is directed towards the promotion of the goals of a social and economic revolution and the establishment of the conditions necessary for the achievement of fundamental changes in the Nigerian society. In specific terms it sets out the framework for the equitable redistribution and utilisation of land, proper zoning arrangements and a healthy environment.(James, 1987).

In Nigeria, there was no consistency or unanimity on any exact set of economic and social goals to be pursued by the community. There could therefore be no agreement on the specific measures that might be taken to achieve development. However during the military period, a fair degree of consensus among the military leaders was articulated on these matters, at least in general terms; and a number of objectives were set out at various times. These were designed to guide the directions for policies and plans. These had implications for the land tenure system (James, 1987).

2.07 Changing the status quo and strategies to overcome the challenges

Strategies that are being put in place as highlighted should involve all stakeholders and be a representation of the need of the people. The analysis that is being completed shown in this study emphasizes and focuses on the desires of existing occupiers which echoes the needs of prospective inhabitants. The present situation is not ideal, and it is imperative that something is completed to ensure that the next generation have a sustainable environment to live in. The way to change has been partly highlighted above; however it would be ideal to have the following: Designs to cost objectives, cost subsidy, Price subsidies, Off-taker mandates, public guarantees, tax holidays, adoption of low cost local materials, subsidy policing, interest rate graduation and zero interest rate where bailouts are required. The removal of negative equity syndrome, stamp duty and import duty waivers, expedited approval processes, head titling, need surveys, easy access to land and land subsidies, cooperation with staff associations, unions, professional bodies. Etc.(Enitan, 2011), would also improve the situation. Landlords have been known to charge exorbitant amounts for rent, as demand still seems to outweigh supply. Therefore, the tenants are having to pay more than usual to secure good accommodation. The solution would be an

increased supply of affordable houses. Then prospective tenants would naturally gravitate away from landlords who make excessive demands and such landlords would not even need a law to reduce their excessive demands. (Onwe, 2012)

The issues concerning planning, infrastructure, housing, land supply environmental sanitation, traffic management and community participation need to be addressed in an integrated manner through a division of responsibilities between the state and local governments.(Lawanson, et al., 2012)

2.08 The present should be a developers dream

If all the different areas of the housing policy are considered appropriately, then the present need of the populace would be a desirable avenue for house builders and developers. There would be a supply of different types and modules of housing that would satisfy all levels of income, family groups and size of units. There would be room equally for prefabricated types of housing (fast track) and insitu build of housing. There would be avenue to cater for all including the students, the unemployed, the employed, the young, the single, the newly-weds, the young family, the larger family, also the elderly and retired as well as the physically challenged.

2.09 Implications of findings on the conceptual framework

The implications of our findings on the conceptual framework is such that following the desk top literature review conducted and the field work involving interviews, questionnaire survey, workshops we have come to the conclusion that the design of the housing units is a key requirement to achieving a cost effective scheme that would be favoured by a majority of the occupiers. The efficient design of the spaces would enhance the value and limit redundant spatial design. This would also ensure that there is value added without wastage.

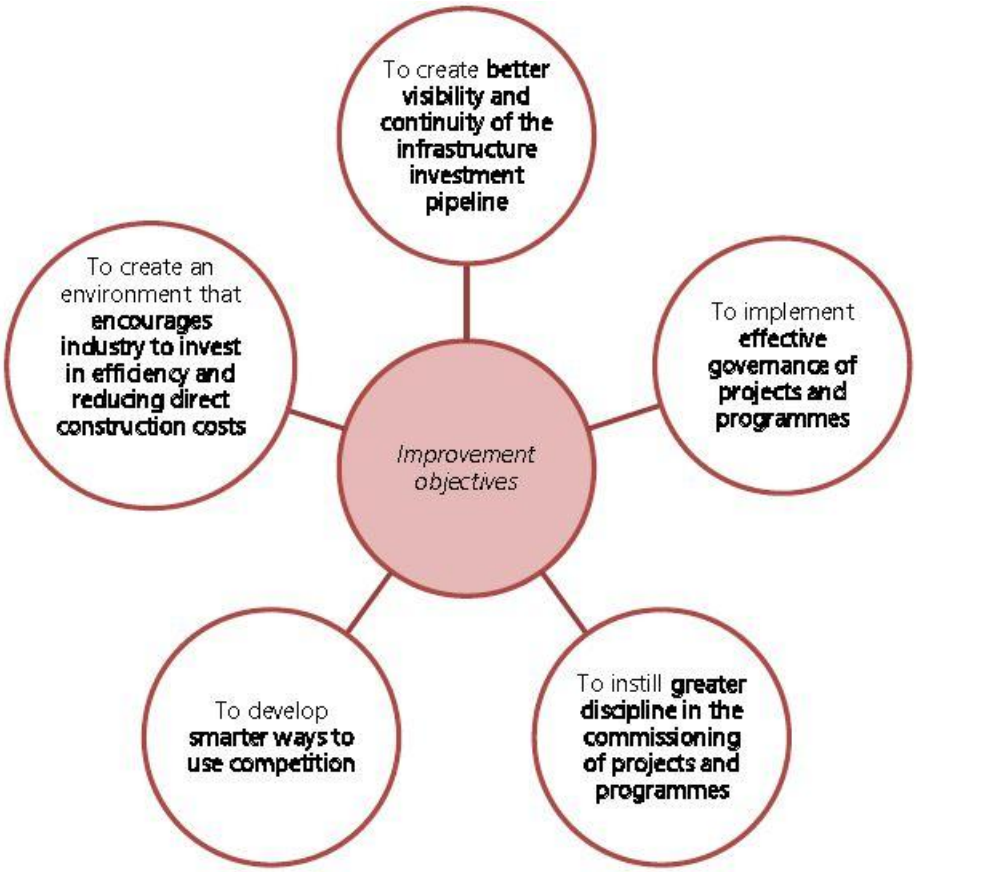


Figure 2.1: Improvement objectives

(Infrastructure UK, 2010)

2.10 Challenges and strategies for addressing sustainable housing production

The challenges for improvement are many and varied as the above figure indicates the improvement objectives if adhered to will ensure amongst other things visibility and continuity of the infrastructure investment pipeline and effective governance of projects and programmes.- The government policy is inconsistent with the needs of the locals. The timeframe for the implementation of policy is too long, and periods between initial deliberation and actual execution can be so long that the purpose is defeated. Also, the time frame between revision of policy is running into decades which is not ideal. The last housing policy, «Nigeria's National Housing Policy" was introduced in February 1991 with the goal of ensuring that every Nigerian owned or had access to decent housing accommodation at affordable cost by 2000.This is yet to be a reality and the recent one is yet to be implemented. Given the importance of housing in the national economy, the federal government of Nigeria setup a 15 man committee on urban

development and housing in 2001. One of the responsibilities of the committee was to articulate a new housing policy. The report of the committee as accepted by the federal government was published in government white paper on the report of the presidential committee on urban development and housing in the year 2002. Part one of the report contains the new housing policy, which was subsequently published as draft national housing policy in January, 2004. The draft policy was subjected to critical comments and inputs across the different states of the federation and the New National Housing Policy published in the year 2006(Aminu & Ruhizal, 2013)**.**

2.11 Negative impact on sustainable housing production

One of the negative impacts on sustainable housing production stems from the collation of unreliable data and information on the users requirements and government objectives. There needs to be a correlation between the user and the provider, be it private developers or government subsidized housing production. For longevity and proper appreciation of the provision, it is essential to be in synch with the residents of this habitation. Having correct figures gathered from the census and other sources is a challenge. To conduct a comprehensive and reliable population census in Nigeria today has become an utopian aim. Census taking in a heterogeneous state like Nigeria has become a politicized exercise. Elite in respective states of Nigeria's federation have come to believe that they need to inflate census figures to place them at an advantage over others in revenue sharing and political representation. (Bamgbose, 2009)

2.12 Housing Issues and affordability

The low income of the average Nigerian makes home ownership challenging. A third of the nation in the lower income bracket cannot get on the housing ladder. A fifth earns less than £30.00 per month (Oluwaluyi, 2008) with Lagos being one of the worst in the country. Land prices are highest in Lagos and unaffordable to a good proportion. There are no jobs and the population is rising. Waiting lists are long for rental apartments, and landlords charge a premium with tenants paying almost half their salaries on rent.(Daramola & Aina, 2004) Affordability is generally accepted as a household paying no more than 30% income for their housing, and the populace are considered cost-burdened otherwise, as difficulties can arise in paying for other things like food, clothing, transport and medical care. (US department of housing and urban development, 2011).The set of rentals are the households that choose to rent primarily, because the option of ownership is foreclosed by lack of capital or available land (Aluko, 2007) ()

Generally the definitions of poverty are subjective(Aluko, 2012) citing the Central Bank of Nigeria (1999) Describes "poverty as a state where an individual is not able to cater adequately for his or her basic needs of food, clothing and shelter and is unable to meet social and economic obligation, lack gainful employment skills assets and self-esteem and has limited access to social and economic infrastructure such as education, health, portable water and sanitation and consequently has limited chance for his or her capabilities".

There is a fundamental link between economic deprivation and environmental degradation(Ghandi, 2007). The Minister of State Works and Housing and Urban Development in 2009, Mrs. Grace Ekpi, was quoted as saying that Nigeria had an estimated 16 million housing shortfall. (This Day, 2009). Additionally, a claim that housing production would catch up by government and the private sector partnering to build at a rate of 400,000 new units per year seems untenable and unjustifiable. Building pace has been nowhere near this, and present indications do not show any improvement on how the policy would bring that about. Acquiring mortgage debt is an insidious problem in Nigeria because of the imbalance of cost of building to an individual's earning power. The majority of the methods required in constructing a house are monopolised. As it now stands, these companies can fix the prices for the bricks, blocks and cement needed for construction (Nnanna, 2010).

The Nigerian building and construction industry last year contributed 2.00% to the GDP. The highest contributor at 18.7% was the wholesale and retail arm closely followed by the oil and gas industry at 15.85% contributions. (The National bureau of statistics, 2011). There is therefore the need for a higher contribution from the housing sector, and a need to make it a more sustainable process.

Present governments in developing countries like Nigeria do not take on this responsibility in a way that makes it possible to provide social housing. For example, the Lagos state property development corporation (LSDPC) is an organisation in Lagos which has become a solely profit-driven government enterprise. They have adopted a policy to only build in areas that would generate the highest return on investment. The organisation commenced as a government parastatal and is now an autonomous organisation.

Nigeria has a long and unenviable history of civil-military political cycles; the state seems to be perpetually in crisis. The country's several democratization attempts and the interchange with military rule, most of which often come with great promises, have failed with the result that both forms of government are now largely doubted by majority of the ordinary citizens (Yagboyaju, 2010).

What is of concern is the fact that households in lowest quality housing seemed to comparatively pay more for their housing both in relative and absolute terms. Such situation is easily plausible in situations of severe housing shortages, with unmet backlogs of housing needs. In such a situation, desperate households are compelled to settle at higher costs into available lower quality housing (Ndubueze, 2009).

2.13 Access to housing finance in Nigeria

The comparison of Federal Government National housing fund (NHF) with the Lagos home ownership mortgage scheme (HOMS)

Prior to the introduction of Lagos H.O.M.S, in 2012, the only window for all Nigerians to access financial facility for land, housing and basic services was the National Housing Fund (NHF) established in 1992. It is pertinent to note that the two schemes have similar objectives and targets. Though the NHF has wider coverage in terms of target beneficiaries (Alufohai, 2013).

Table 2.2: Comparism of Lagos home ownership mortgage scheme (HOMS) and National Housing Fund (NHF) Source (Alufohai, 2013)

	The Lagos H.O.M.S	National Housing Fund (NHF)
Coverage	Lagos Residents	Nigerians
Maximum Loan	Depend of the house	N15 million
Tenor	10 to 20 years	25 years
Interest Rates	6% per annum	6% per annum
To Qualify	30% Equity contribution	2.5% of Monthly Salary for 6 months
Fee	N10,000 for Civil Servant	Fix by PMI
Admin Charges	N23,000 Admin Charges for Non Civil Servant	Fix by PMI
Funding	Lagos State Government	Federal Government

2.14 Lagos state promotion of home ownership

Promoting homeownership is an underlying objective of the government's programme. The new government in Lagos seem to understand and appreciate the need for a more affordable crop of housing in Lagos. Lagos is becoming one of the more expensive places to live in the country and holds an attraction for all. Settlers have always come to Lagos. Traditional history has it that the first settlers on the island which was variously known as Oko, Eko, Awani were the Awori, the children of Olofin, a small Yoruba group normally resident on the west Bank of the River Ogun, beyond the Lagoon. (Seriki & Pullybank, 1975) Homeownership offers unparalleled opportunities for households to accumulate wealth, but for some, it is not an option, and the provision of social housing for rent should be given equal priority. In recent years in other countries internationally, for example, the UK, there has been an increase in the development of sustainable housing funded through the Housing Corporation, but the increase has mainly been in shared ownership and equity share schemes.

2.15 Housing issues Internationally

In studies of housing development internationally and in Nigeria, its apparent to see where the mistakes have been made and it is important to learn from the mistakes of the past to ensure that this does not recur

The picture of homeownership in Britain is one of diversity and change. Home ownership is neither uniform nor static. (Murie, 1993) Sales of public sector dwellings have had a profound effect on the British housing system. They have been the primary policy instrument in the significant expansion of home ownership that has occurred since 1979 and have been particularly effective in extending owner occupation down the income scale (Williams, 1993).

In the UK, the government is sponsoring a new £474 million Local Infrastructure Fund that will support investment in key local projects. It will open up new development, including locally supported large housing sites and bring surplus public land back into use, delivering much needed new homes, businesses, infrastructure and local transport schemes. Also earmarked is a further £100 million to bring forward public sector sites for development (Osbourne, 2012).

Factors affecting the overall demand for housing include, demographic factors, income, price and perceived availability. (Harriott, et al., 1998). The Government's plans for a major house-building programme show a strong commitment to meeting the needs of those living in unsatisfactory housing and

those whose aspirations to home purchase are not being fulfilled. There have been long discussions about the scale of the house-building programme required for the growing numbers of households, with different organisations offering a range of projections. During the people of this inquiry, the Government published new housing projections which suggested that the number of households was growing at about 209,000 per year, about 20,000 higher than the previous estimate. Any house-building target has to be sufficient to match household growth. The Government has set a target of 200,000 additional homes per year by 2016, about 40,000 more than is currently built. Bearing in mind the new household growth projections, this target may be inadequate. Several assumptions are, however, built into the projections which may prove false. As housing policy is increasingly based on household growth projections, it is important that these projections are kept under review as firmer information becomes available (ODPM - Housing Planning Local government and the regions committee, 2006).

Currently, more than a billion people around the globe live in inadequate housing. One in every four people on the planet lives in the South East Asia region, and more than 14 percent of South Asians have no homes or live in such inadequate housing as urban slums and squatter settlements. South Asia's housing and housing finance markets are dynamic, but limited in their outreach. (Nenova, 2010) In South Asia, housing finance reaches the upper income population groups; and the main challenge is to expand access to the middle and lower income groups, developing housing and housing finance markets that are both sound and accessible. The markets need balanced funding models and a diversified toolbox of instruments for different lenders. Complicating factors include the rapid increase of land prices in most countries over the past decade; poor legal infrastructure; deficient financial systems; a dearth of long-term funding at fixed rates; limited developer finance; and problematic access to housing finance for low income, rural, and informal population groups (Nenova, 2010).

2.16 Self-builders – the majority

In Nigeria it is popular for the individual to want to build his own home. There is a feeling of pride and achievement that this gives him or her and a new status in their immediate family and society. Almost every Nigerian has grown up surrounded by cement block manufacturers parading their products in their vicinity and understanding the concept of purchasing a plot of land. This land is usually bought at great cost and left fallow for a while until the individual is able to either clear and fence it or continue to commence construction works on it.

It is not unusual for a construction project to commence and take up to ten years to complete. A dearth of infrastructure makes it difficult sometimes to commence appropriately or even to complete works. The infrastructure required is usually not there, and the level of awareness of PPP is still insignificant despite government effort to get the private sector involved in the provision of infrastructure using PPP as a model. (Taye & Dada, 2012). It is usually whenever the self-builder has funds that he progresses the works and building materials are often left idle on the site for months on end awaiting the next phase of development. 30-40% of the population lives in urban areas, with an average household of 5 persons. The occupancy ratios of houses in Nigeria is 6 persons for a room of 20 sq m. 60% of Nigerians are without adequate shelter (under-housed and no housing). Residential home ownership is less than 25% compared with 75% internationally (Adeleye, 2008).

2.17 House developers

In Nigeria, real estate development is a growing industry fed by services, society, safety and land security seekers. As issues surrounding landed property being sold to multiple buyers continue to be common in the high courts, it makes buyers wary of family land owners who purport to be the scion of the families and attempt to sell plots off to unknowing buyers keen to jump on the self-build bandwagon. Self-build is the major construction approach for house owners in Nigeria. (Adeleye, 2008) As one of the largest and most populated cities in the world, Lagos provides a clear example of how the presence of old and new patterns of land ownership increased claims on urban space. Here competition for land is expressed in the "Omo Onile (children of the owners of the land) syndrome" However the control, which the Omo Oniles now exercise over Lagos land, is not a right that was recently acquired. Rather, it is rooted in Yoruba land tenure system, shaped by the dynamics of inter-group relations at the early stage of Lagos history and modified later by the British idea of private owner ship in a rapidly changing urban environment (Akinyele, 2009).

House developers are trying to tap into this market of the populace suffering from a fear of falling into the hands of fraudsters. Also, they are providing infrastructure which the government is meant to provide but are usually not able to. The provision of services infrastructure is a key requirement in any housing development as adequate roads, drainage network, water, electricity and sanitation is key to creating a good sustainable development that would add value to the property. This would hopefully do so as concentrated populations in large and small cities provide many economies of scale in the provision of environmental infrastructure and health services, and in the control of pollution related environmental problems. (Ukaga & Afoaku, 2005) PPP is used internationally to do this. With the advent of PPP,

governments can no longer hide under the disguise of inadequate funds being their major handicap. These procurement options that offer the benefits of two worlds are being used all over the world to meet global infrastructure demands (Akinyosoye, 2010).

2.18 The policy process

In looking at how policies are made and carried out, it is important to bear in mind the limits imposed by the wider context, and to remember that, although there are real decisions and real choices to be made, the nature of those decisions and the range of choices is largely determined by the framework of capitalist social relations. (Malpass & Murie, 1999) A further relevant consideration is the influence of history to the extent that the issues to be resolved and the range of available options are both affected by what has happened in the past. Because parties alternate in office or individual parties change their emphasis government as the party in office may have a stated purpose and intentions which are substantially different from what the government as a whole set of organizations engaged on delivering public policies is actually doing. The bulk of policy delivery at any given time reflects the political priorities and legislation of previous governments (Hogwood, 1987).

5 Areas affecting housing policy:

1. Demographic change
2. The economic context
3. Social change
4. The political context
5. The wider structure of the welfare state

2.19 Government involvement in the policy process

Actions that governments can take towards promoting, protecting and ensuring the full and progressive realization of the right to adequate housing include: (Max Fordham, 2012).

- Prohibiting, and guaranteeing protection from, housing discrimination on any ground;
- Providing equal and secure access to land and protection from illegal forced eviction;
- Ensuring transparent, comprehensive and accessible land rights and tenure systems;

- Promoting access for all to water, sanitation, and other basic services and amenities, especially for the poor, women, and other vulnerable and disadvantaged groups;
- Promoting equal access to appropriate and sustainable housing finance for all, including mobilizing innovative financial and other resources, both public and private;
- Making housing habitable, affordable and accessible by, among other ways;
- Mobilizing resources - both public and private - for housing development;

2.20 Enabling environment

The government's policies need to create an atmosphere that draws in external and internal investors, developers, self-builders, material manufacturers/suppliers and all parties. Land use decree is been discussed over the years as a cog in the wheel of speedy, safe land acquisition. The deficiency of this part of the system is notorious. Also increasing cost of building materials with cement being the main culprit is another problem. The industry feels the government can and should ensure that the price of cement is lowered by allowing greater competition and also investing in research that would allow other materials to compete effectively on the same playing field. Government is also asset stripping and a good example is cement factories being sold off to private companies. The cost of cement is still not reducing rather a monopoly seems to be created. As research progresses, it is envisaged that appropriate outcomes and processes that would assist the designers and policy makers in drawing up adequate policies enabling the specification of the right/available local materials to ensure sustainable affordable build in different microclimates all over Nigeria would emerge (Olagunju, et al., 2011).

In Nigeria, a dilemma remains that of adhering to neoliberal policy of less government participation in the face of dire social need. In this case, it would appear that the need to continue to adhere to macro-economic policy has over-taken the more local needs of the people. If policy failure is inevitable, the outcome would be felt more keenly by the people they are meant to serve (Nubi & Oyalowo, 2010).

In human resources, Nigeria has highly skilled engineers that can compete favourably with their counterparts anywhere in the world. However, it has been observed that the engineering policy framework and practices have not given Nigerian engineers the opportunity and exposure to participate at the top professional level in engineering activities of the multinational companies operating in Nigeria. Nevertheless, there is a growing awareness that local production of goods and services, provision of key infrastructure such as roads, power supply, dams and water treatment plants, communication equipment,

houses, hospitals, raw materials for local industries, etc, depend on a sound engineering base. This has brought to focus the urgent need to harness fully the potentials of the engineering sub-sector for a sustainable economic growth and development and environmental sustainability.(Federal Government of Nigeria, 2005) Finally, design and construction must also align with best practices and ensure that health friendly methods and materials are used for construction (Lawanson, et al., 2012).

2.21 Improving infrastructure

Poor infrastructure in Lagos has been debated as being the root cause crippling rapid development. Infrastructure has been defined as "the basic structures and facilities necessary for a country or an organization to function efficiently, e.g. buildings, transport, water and energy resources, and administrative systems."(Hornby, 1995) Generally there is the tendency to regard the provision of such services as a social responsibility of government, which implicitly denies or minimizes private sector participation (Olukoju, 2003).

Housing situation in Nigeria differs between the urban and rural areas. In the urban areas, the major problem is the shortage of housing with its associated overcrowding and squalid environmental conditions. In the rural areas, however the problem is largely that of poorly ventilated structures that lack infrastructure and services like potable water and electricity supply, among others (Adebiyi & Dauda, 2001).

2.22 Sustainable materials to build

In order to make the material sustainable we need to ensure a prompt delivery and reduce the overheads and time frame attached to the logistics of delivery. The manual procedures and processes of the present system cause lengthy activity periods, which time adds up to cost of contingencies and overheads on the project. The long periods of material ordering, shipping, clearance from ports and subsequent transportation to the point of use, add to delivery times. Just-in-time deliveries cannot be practiced due to unavailability or inadequate supply of materials. High cost of inflation necessitates stockpiling. Stockpiling becomes necessary at the prevailing prices to beat inflations. For this reason too, just-in-time deliveries may not be practical.

Stockpiling time of materials cause extended tied down capital that would otherwise have been better

invested. Long lay down periods of materials become economically unviable, requiring extensive storage facilities and space. The extra external security, monitoring team and security check points for long distance haulage routes, have their added logistics of fuel supply, vehicle maintenance, salaries, administrative cost and other expenditure.

Traditional purchasing processes completed on a paper-based system, have many associated drawbacks: low accuracy, time consumption, labor consumption, loss of data, and high uncertainty (Hadikusumo, (2005)) inefficient procurement practices result in costly delays, loss of profit, and possible litigation (Ekwere & Tang, 2010).

2.23 Government policy history

The Nigerian National Housing policy was formulated in 1991 with the aim of providing sustainable housing to the populace and an example of government initiatives to improve the system. However the policies are not being properly implemented and where they are, they are not being well monitored. This policy was revised in 2004 to resolve problems in usage. A presidential technical committee on housing and urban development was set up by government to address these new housing reforms. It recommended the restructuring of the federal mortgage bank of Nigeria (FMBN) and the creation of real estate developers association of Nigeria (REDAN), and building materials producers association of Nigeria (BUMPAN). The new housing reforms created financial mechanisms and institutions that will make available to the private sector (developers) funds for the production of mass houses, and allow purchasers (mortgagors) to have easy access to borrowed money through the primary mortgage institutions (Ebie, 2004).

Principal organizations on whose shoulders rest the mass housing delivery mechanism under the national housing fund (NHF) scheme include:-

- The real estate developers association of Nigeria (REDAN) formed on 9th May, 2002.
- The federal mortgage bank of Nigeria (FMBN) – Act No 7 of 1977 and updated Act No 82 of 1993.
- The primary mortgage Institutions under the umbrella body of the mortgage banking association of Nigeria (MBAN).

- The building materials producers association of Nigeria (BUMPAN) formed on 4th March, 2004 (Ozili, 2009).

2.24 Policy Implementation

Policy influence must start from an understanding of the institutional, administrative and legal contexts from which policies emerge. Ethical positions on policy issues are acceptable (indeed unavoidable) but should be explicit and honest (O'Sullivan & Gibb, 2003).

One area to improve government policy would be in the building regulations or building code as it is referred to in Nigeria. It is aimed at curbing the anomalies such as the use of fake and untested building materials and lack of adequate building regulations. This would invariably arrest the incessant waves of building collapse. (Mosaku, et al., 2006). There are still a number of cases of collapsed buildings and poorly built structures due to a poor implementation and monitoring. The neglect of quality control in the construction industry has resulted in many defective and aesthetically-displeasing buildings and the rise in number of collapse buildings in the past years.(Ayodeji, 2011) The building officers do not do their jobs adequately and there is corruption in the various sectors in charge of overseeing building works.

There are limited attempts at formulating direct climate change policies in Nigeria. Rather, efforts are disjointed and remain uncoordinated. They are in terms of (i) traditional' policies' and institutions which have developed culturally as the different tribes of the country quests for serene and sustainable living environment and (ii) government legislations on the best practice for the relevant components of the environment. (Soneye, 2012) In order to strengthen political governance and build capacity to meet these commitments, the leader of the new partnership for Africa's development will undertake a process of targeted capacity building initiatives. These institutional reforms will focus on: administrative and civil service, strengthening parliamentary oversight, promoting participatory decision making, adopting effective measures to combat corruption and embezzlement, undertaking judicial reforms. (Nepad, 2001) However, the observed shortcomings of the public service have also been linked to inadequate financial, infrastructure and human resources, particularly the latter (Oyelaran-Oyeyinka, 2006).

The partnership between the public and private sectors should be properly defined so that both can play their statutory and complementary roles towards engineering development. (Federal Government of Nigeria, 2005) The formal and informal private sectors have consistently been providing over ninety

percent of the housing stock in the country, yet our housing stock remains considerably below the requirement of the country (Aluko, 2007) (Anon., n.d.)

Some have tried to compare the policies of the various regimes but can we assume that one has been better than the other. The need is existing for both types of government. The question of whether there is a qualitative difference in policy between civilian and military regimes (Onyeoziri, n.d.).

2.25 Monitoring sustainable delivery

With few exceptions, contemporary examples of low impact construction are small scale and rural. This presents the risk that the materials and techniques are dismissed as irrelevant to larger scale projects and/or urban design. However historically many of them were used at a larger scale and in urban areas. If anything, technical advances should mean that we are better positioned to use them than before, but the knowledge gap has expanded in recent years, not least because of the ease with which mechanical and chemical manipulation of materials can take place (Halliday, 2008).

Globally building construction is responsible for the current atmospheric pollution and wastes generation. It is also responsible for the current consumption of 25% of wood and 40% of aggregates, 16% of water and 40% of the energy annually spent. (Braganca, et al., 2002) It may, however, be observed also that the rising cost of building construction in Nigeria can be attributed to some other factors, which include high transportation cost, devaluation of national currency (Naira), uncontrollable prices of building materials and the over dependency on the importation of building materials (Fasakin & Ogunsemi, 2003) Starting with Lagos state in Nigeria the federal government have created a carbon awareness campaign,(Maduako, 2010) however there is the need to take it to the next level by ensuring that the populace have a thorough understanding of what not doing things appropriately could involve and the dangers for the future generations. Sustainable delivery is defined also as cutting back now to ensure that the future would have enough. There needs to be a committee or appointments made by the president and his cabinet to give the public the understanding that this is being driven right from the leadership and authorities.

One accepted definition of sustainability is that proposed by the World commission on environment and development in their 1987 study commonly known as the Bruntland commission report (WCED 1987). (Norton, 2012) Most advocates of sustainable development recognize that, for it to be realized would require changes in human values, attitudes and behaviours. (Raskin, et al., 2002) suggest that such critical

value changes are needed to promote new quality of life, human solidarity and ecological sensibility to counter the present value system that places much emphasis on consumerism, individualism and the domination of nature (Mabogunje, 2004).

2.26 The private developer's dilemma

Private developers will always face an uphill task in the Lagos environment, as land prices are predominantly high and get higher in the highbrow or fully developed areas. Therefore the government sees it as another way to tax the masses who predominantly don't have a choice but to attempt to purchase land in the area. It is seen as a worthwhile investment and attracts a majority of buyers and players in the industry alike. Corporate developers need to play a more participative role in building homes at a scale that can bring forth a price reduction and make it more available to the teeming masses of people looking for good quality and cheap accommodation. The numerous and monumental problems that bedevil public sector housing delivery has led to a paradigm shift of involving the private sector in housing delivery, while the government should create the enabling environment (Henshaw, 2010).

Other ways of ensuring prompt housing delivery would involve some of the following:

- The National housing trust fund being made available to a lot more people.
- The establishment of the primary mortgage institutions, thrift and credit societies etc.
- Focus on the development and sale of viable real estates.
- Lobby the government sector to provide land at a very good rate that would not damage the scheme before take- off.
- Implement rural housing programs
- Upgrade of infrastructure
- Ensure key workers and civil servants are adequately housed

2.27 Government challenges

The government has major challenges as the millennium development goals set and accepted by the present government has highlighted some other key issues which are yet to be tackled by them. For example in the area of education it is affected by corruption, gross inefficiency, wastefulness and duplication of projects in the same areas by the Federal government and donor agencies. (Okeshola, 2012) Millennium goal 7 focuses on integrating the principles of sustainable development into country policies and programs; reverse loss of environmental resources. The prospect of meeting environmental sustainability in Sub-Saharan Africa is under serious threat as most countries have fared poorly on environmental issues. Yet environmental sustainability must be seen in the context of the complex links between the environment, development and poverty. (Mabugu, 2008) Nigeria has become increasingly urbanised in the past five decades. The proportion of the population living in urban areas rose from 15% in 1950 to 23.4% in 1975 and to 43.3 % in 2000 and projections indicated that more than 60% will live in the urban area by 2025. A sizeable proportion is likely to live in slums if care is not taken. (Millennium development report 2010) The issue of primary education, which, if properly implemented, would go a long way in helping to educate the masses about the dangers of indiscriminate energy consumption and the advantages of recycling. Although the economic situation has created a country of forced recyclers, there are still other issues of primary healthcare, gender equality, water, sanitation and Aids. The government can be made to realize that by creating a good housing infrastructure it would alleviate some of these issues especially water provision, sanitation and better healthcare. It would also reduce the transference of disease as less people crammed into a room or house and reduction in urban slums always minimizes transference of illnesses. In line with the MDG targets, financing focuses on developing city wide infrastructure and upgrading slums to improve living conditions and enhance economically productive activities. (Millennium development report 2010)

Another challenge is that Africa has become increasingly uncompetitive, as a result of its weaknesses in governance and infrastructure, low capacity in science and technology and lack of innovation and diversification from primary products (Commission for Africa, 2005).

- The focus of Lagos State government's attention in the housing sector is shifting away from direct housing construction towards an enabling role of developing policies. In order to undertake a complete assessment of the performance of this shift, requires a broader over-view of the housing sector as a whole and a better understanding of the mechanisms governing housing sector performance. Some of the expected alternative strategies consist of:

- Cooperative housing association;
- Provision of a comprehensive conceptual and analytical frame-work for monitoring the performance of the housing sector;
- Real estate development companies;
- Build-operate-transfer policy;
- Housing management;
- Rehabilitating essential infrastructure and services, and improving financial and resource mobilisation in our cities and forms;
- Creation of a set of practical tools for measuring the performance of the housing sector using quantitative, policy sensitive indicators;
- properly planned improvements of infrastructure and public services in the projects towns and sites to enhance the growth of productive activities and the revenue base;
- examination of the existing policy of the government in line with the housing objectives, policies and programmes;
- Better scrutiny of the role of the private sector and several other ways in which the low income group could be helped. (Aluko, 2011)
- The past efforts in housing provision are based on the ideals of 'what-should-be', and not on the reality of 'what-is'. In order to address the issue of affordable urban housing and enabling infrastructure in Lagos realistically, the value system of the indigenous people need to be incorporated. This implies that the traditional institution should be involved as a stakeholder in the public-private partnership to be established while the progress to date should be sustained and built upon. If the cultural institution were involved at the appropriate level, it would be difficult for the 'money-bags' and the lawless citizens in the society to attempt to circumvent the provisions of the laid down agreements. The ordinary urban dweller deserves a decent place to live in metropolitan Lagos (Adewolu, 2003).

2.28 Government opportunities

Government need to give incentives to the developers and self-builders to use local materials as opposed to what they have been used to for years. Incentives would include, tax incentives, government subsidies on rates.

As capital is highly mobile investors will favour the sectors/locations that provide the best risk/reward profile. Short term and overly complex public policies with limited effects on the profitability of investment projects are unlikely to attract private financial flows. On the other hand overly generous tax credits and regulatory incentives in the form of exceptions from environmental or labour laws could create economic distortions and harmful distribution effects (Glemarec, 2011).

Government has to decide if it wants to operate as a regulator or implementer or both Regulators control, Implementer executes. Doing both leads to significant drain on resources (Adeleye, 2008). Effective states that can promote and protect human rights and can deliver services to their people and a climate for entrepreneurship and growth are the foundation of development. Without progress in governance, all other reforms will have limited impact. While there have been improvements in many African countries, weakness in governance and capacity is the central cause of Africa's difficult experience over the last decades. Improvements in governance, including democracy, are first and foremost the responsibility of African countries and people, and they take time and commitment (Commission for Africa, 2005).

There are many kinds of landlord: some are rich while others are poor; many operate in the formal sector and even more informally; both companies and governments may rent out property. Understanding the diversity of supply is a critical element in understanding how best to devise policy and influence the housing situation (Gilbert, Alan, n.d.).

The informal sector is generally viewed as another sector outside the normal organized formal sector that provides employment and sustenance through engaging in a variety of activities, such as street trading, hawking, vulcanizing, local manufacturing and cobbling to mention but a few. The sector is characterized by small scale operations, labour intensive techniques, low-income families, private and indigenous ownership of enterprises that are largely unprotected by government (Lawanson, 2011).

Informal sector participants generally live and work in appalling, often dangerous and unhealthy conditions, usually without basic sanitary facilities, in the shanty towns of urban areas (Lawanson, 2011).

These slums and irregular settlement have become so pervasive in Africa that they now out-number legally planned developments, and their social legitimacy appears to be no longer in question; but the appalling environmental conditions associated with them constitute a major threat to the health and well-being of the urban community (Nwaka, 2005).

At the same time, generous support is needed from policy makers and international organizations like the World bank and the United Nations to provide capital acquisition and technology with enabling environment for the development of a more proactive system capable of effective management of informal sector activities within the urban environment (Farinmade, 2012).

Indeed, current research suggests that slums and irregular settlements grow not only because the people who live in them are poor, but because of overregulation, the sluggishness of government to provide adequate and affordable land, and failure to harness the energies and resources of the poor in the right direction (Nwaka, 2005).

2.29 Summary

Architects should be at the forefront of development to prevent production of housing damaging to the environment and sustainable for example by recycling materials and buildings. In Lagos in recent times there is a deluge of informal property made up of a mix of temporary makeshift structures and proper but unregistered structures. The onerous terms for registering a property, including the high costs, ensures that a percentage of structures being built would not be registered with the local authority. There is a fear growing in the minds of the Lagos populace prompted by the overzealous tax collecting drive of the government officials. This only makes everyone wary of prohibitive costs levied at the house owner and occupier. There are more and more tenants becoming underground tenants with no visible landlords also.

The main features of informal sector economic units are: ease of entry; small scale of the activity; self-employment; little capital and equipment; labour intensive technologies; low skill; low level of organisation with no access to organized markets, formal credit, education and training or services and amenities; low productivity and low income.

The level of application of physical planning principles and practices to control the effect of informal sector activities has been very low. All the above recommendations can only be achieved if there is undivided commitment by the planning regulatory agencies and the government agencies saddled with the responsibility of planning and managing the study area.

It's worrying that the previous governments have not been able to harness the raw materials naturally available to use in the building industry. There is a dearth of skilled labour, a lack of a manufacturing base for building materials as everything is imported from abroad and even the new buzz in the cement industry has not lessened dramatically construction costs. It is therefore not surprising to see individuals building in areas and at a pace that seems impossible to sustain. However it is clear there is an underground network of similar builders who dare the law due to the financial obstacles that the law brings to bear on land and property development generally.

The Land Use Act has been contentious and needs to be redefined appropriately. The government policy is inconsistent with the needs of the locals. The information gathered is inconsistent with user requirements and government objectives hence it affects the housing production. The low income of the majority of the populace makes affordability a misnomer. Access to housing finance is difficult and the few possibilities have a few hurdles to overcome. Housing policies internationally in similar terrains seem

to deal better with their problems than in Nigeria. However we have a number of self builders who gradually overcome their own developments and contribute to the housing requirement in their next developments.

The literature review has identified that Lagos state government is drifting away from house building directly to becoming more of an enabler, However government need to give more incentives to the use of sustainable and local materials otherwise investment will continue to tarry in this sector. With the increase in population, strategies and current policy need to represent all stakeholders to ensure consensus in delivery of sustainable housing. A supply of housing for all levels and affordability is essential.

The literature review conducted using electronic databases, searching of national and international journals, bibliographies of relevant papers, citation search, inter-library loan facilities for relevant materials, textbooks and published Ph.D. theses, helped in establishing the current body of knowledge on the sustainable housing design and policies and gave information and insight into the prevailing problems. The research adopted a pragmatic approach combining both qualitative and quantitative approaches. Prior to the primary data collection phase of the research, ethical approval was sought for and obtained from the University of Wolverhampton's School of Technology Ethics Committee.

The relevant information, gathered through the literature search on sustainable housing and design and technology impact from the user's viewpoint and their interrelationships, was analyzed, resulting in the development of the conceptual framework. The qualitative data obtained was analyzed also using thematic/content analysis approach in areas and the findings were used to refine the framework.

CHAPTER 3: DESIGN, TECHNOLOGY AND SUSTAINABILITY

3.00 Introduction

Design and technology in construction is so crucial now. In the age we live in everything is much more automated and completed faster. The only way this is possible is adopting a more structured way of designing and optimally a more successful way of realising this designs in construction. The situation is changing as more and more firms in the construction industry start to realize the benefits of information technologies such as improved communications between the project participants which can lead to improved cost-efficiency, better quality and competitive advantage (Kim, 2003).

A research study conducted by the Center for Integrated Facility Engineering (CIFE) at Stanford University shows that using SMART collaborations solutions in construction and design companies can be easily justified as a good investment. Design process communication methodology (DPCM) specifies elements and methods for exchanging and organizing digital information in the context of the design process. Results demonstrate that designers employing DPCM accurately capture processes with little effort. (Senescu & Haymaker, 2011) The goal of the Architect/engineer in the information age is not necessarily to compress the time required to produce traditional documentation but to exploit the amount and nature of information available about a proposed building/facility to the benefit of the building designers, users and owners. (Phiri, 1999)Climate responsive design skills have made it possible to reduce the design energy load of a building by 70-90%. Once the appropriate climate responsive design strategy has achieved low energy loads by employing the appropriate design concept and technology the next logical step will be to aim for a zero energy building. (Gyoh, 2013)Designing for sustainability requires eco-friendly decisions via efficiency and moderation in the use of materials, energy and space. These decisions cannot be taken in isolation of the present and projected environmental and socio-economic conditions over time (Adenaike, 2013).

It also seems designers are too focused on quality as opposed to costs; they are not keeping up with the times in terms of innovation and new products. Over-specification can also increase costs. Also designers and specifiers find there are more stakeholders and approval bodies to satisfy which can cause a delay and hence increase costs (Infrastructure UK, 2010).

3.01 Designers Input

Designers can drive sustainable construction from inception by understanding what sustainability in their own context means. Once they have a true understanding of what the end goal is, they are more likely to be driven towards always ensuring that all design efforts are targeted towards these objectives.

The approach of the designer greatly influences energy consumption. It has to do not only with insulation and technology, but also with an understanding of passive techniques. Some low-energy buildings fail to meet the expected energy savings because the energy-efficient technologies incorporated into the design are not correctly integrated into the building (National Renewable Energy Laboratory, 2001).

The goal of every designer should be to use their skills to contribute to energy efficiency.
Thinking things through from the onset i.e. from the earliest design stage is essential and the following will assist:

- Building design, building shape, building type and temperature zones
- Commencing with the analysis of the site and then the initial design.
- Good architecture involves good design and planning layout including proper window locations and insulation of a building.
- Criteria for selection of materials, assessment of materials, construction approaches, material sciences
- Services involving – plumbing, ventilation, heating and cooling systems
- Construction involving, noise, moisture problems, clean ability
- Implementation involving project mgt, construction site, construction waste and economics.

- Nature aspects - Hydrology, geology and topography, adaptation to climate, flora and fauna.
- Social fabric- Traffic, cultural patterns, urban/rural interaction
- People – sufficient room for all, comfort, participation and beauty.

Constructing an environmentally friendly building requires systems thinking that follows through the entire process (Bokalders & Block, 2010).

Improved day lighting design in buildings will help to reduce lighting and energy costs, as this will enable better ventilation as well as visibility later into the day. It will also have an impact on

the health and wellbeing of the occupants. The alternative electric light sources have only been available for about a hundred years, a very short time in evolutionary terms. It may be that the main impact of a greater understanding of the role of light exposure in human health will be to return attention to the better day lighting of buildings (Boyce, 2009).

3.02 Sustainable design in the Nigerian context

For the deficit to be reduced drastically, the design of the houses has to change. Lagosians need to redefine the whole design process by ensuring that the design used for housing in Lagos is accommodating of all the critical factors presently. This includes speed to build, using available materials and ensuring that the quality of the build can stand the test of time and is commensurate with similar buildings that have been around. However, the design is developed with research completed on the various possibilities of the materials as well as the costs of the units within the present social and political environment.

The design constantly adopted by Lagos state has been a colonial type layout that needs to be revised. Basis of redesign would include the climate and rainfall impact on the built environment, the harsh sunlight conditions; and the poor drainage. The layout of the existing estates will be further analyzed to reflect why it is being designed and to what populace it's targeted.

We aim to focus on the lower-class and input their specific requirements into the scheme as they assist in the development. We will have a hands-on relationship where key and core issues can be identified for assessment.

This is aimed at eliciting the true key requirements for imitating multiple dwelling sustainable housing units in countries with similar weather, values, culture and problem. The readily available material in Nigeria proves to be cement, so be it as that would be the local sustainable material of choice to use. Interestingly, it is available everywhere and almost everyone can easily mix it and apply it, whereas introducing new materials would prove futile as the artisans may not know how to install or apply it. It is therefore important that training is included.

The sustainable house is dependent upon integrated design and this is equally true of sustainable communities where the principles underpinning the individual house are multiplied several times over at the level of the housing estate, questions of land use policy, density of development, integration of

transport, social mix, ownership and tenure mix, all become important. Decisions made at the planning level will inevitably affect construction decisions (Edwards & Turrent, 2013).

The primary elements of any new building are the technologies and materials. These elements play an important role on the sustainability of a building. Their embedded sustainable properties and intrinsic values make up the elements of sustainable architecture (Attmann, 2008).

Sustainability in the Nigerian context relates to a southern climatic realization of zoning which affects the cultural and social values of the people. For example the Yoruba in the south west build their houses in a particular manner which relates to the ethics, values, behavioural pattern and language of the people. The mud for the huts is readily available so also is the thatch for the roof. The necessary skills have developed over time based on demand and necessity. The proximity to a water source is important for moulding the clay/mud as well as the palm tree for the roof. The adaptability and expandability of the huts allows the family growth to evolve easily into bigger huts and the existing can be broken down and rebuilt or extensions completed very quickly.

This has reduced the housing shortage in the rural areas; however the migration to the more developed towns and cities from the rural area has created a vacuum in the villages and a slum in the towns due to overpopulation and exertion on minimal infrastructure and services.

3.03 Design and Technology

Low-cost housing development must be embarked upon as a collaborative effort between the private sector and the government. The private sector operates under the principles of market efficiency thus it is able to reduce costs and improve service, provide more options and meet demands beyond government capacity (Nightingale, et al., 1997). However, there are rarely any positive returns when investments are made in low cost housing projects for low income people, therefore the government must facilitate the process by providing meaningful incentives (Okwo & Soboyejo, 2005).

The use of performance-based design (PBFs) has been suggested as an effective and ethical incentive for cooperation in which the savings derived from highly efficient design increases the designers compensation (Kibert, 2008).

Technology is the way forward to ensure that products are innovatively designed and produced at a scale that would allow economies of scale and reduce costs as well as giving impetus to research and

development. The more technology simplifies the process the more economical production will be (Richard, 2010).

In hot climates, it is important to design buildings so that excess temperatures are minimized and then to work with passive methods of cooling. In order to minimize excess temperatures, there are many architectural design factors to consider. The building itself can be protected from the sun and the indoor heat load can be reduced. Among other things, all windows should be shaded so that direct sunlight is blocked while indirect daylight can illuminate rooms.

In some countries such as Germany, there is a well-thought-out system for bank loans intended to help those that want to build in an environmentally friendly manner. Since an ecologically oriented building is very energy efficient it is assumed that the building will be valued highly many years into the future, bank guarantee a low interest rate and it is possible to borrow up to 95% of investment costs (Bokalders & Block, 2010).

"There is no much relationship between industry and the academia; otherwise one would expect industry to fund some researches. If the government does not put some kind of legislation which makes it mandatory for industries to challenge the academia with their problems, then we will not move forward. When they challenge with their problems, they should also try to fund the researches." (Ikponmwosa, 2012) We have researched into using bamboo to act as reinforcement in low cost housing schemes (Ikponmwosa, 2012) (Olusanya, 2012).

3.04 The Role for Designers

Despite the fact the construction industry is responsible for 30% of the total waste production and 50% of the extracted raw materials. (Eurostat, 2008), architects have a key role to play in helping to manage climate change. Architects are also active players in shaping the future through the design choices they make (Edwards, 2010)They can design natural habitats as part of the developmental process - these include ponds or wetlands, tree planting, turf roofs, creeper-clad walls, natural grasslands (flower-rich and left uncut).They can source construction materials from an ecological point of view, helping to maintain local or regional biodiversity by the choice of products or materials employed. They can bring nature into closer contact with people's lives. This can entail interior as well as exterior planting and the exploitation of views to enhance the perception or visibility of the natural world. The objective is to ensure that the human species is not disconnected from the natural world (Edwards, 2010).

In the last few decade's architects, designers and researchers developed design strategies and approaches to facilitate change and the reuse of building parts; nevertheless transformable building is still restricted to a small scale and specific functions, such as temporary / transitional buildings (vandenbroucke, et al., 2013).

3.05 Design Brief

The brief or requirements is crucial to getting any building project right. Designers need to have investigated the actual needs, wants and aspirations of the direct users and ensure that the concept, the schematic, the final designs matches and meets up to their demands both now and in the foreseeable future. The role is a pivotal and critical one that cannot be compromised, belittled or marginalised. It is essential that it is designed correctly from the outset to prevent unnecessary abortive works and dissatisfaction of the users or investors. A housing estate or group of homes built to satisfy affordable yet sustainable needs will need to be fine-tuned and researched appropriately. This is to ensure that the core users who form a large portion of the population would want to live there for a while without feeling left out of mainstream society or feel marginalised in anyway.

The requirements of the locals requiring sustainable housing in Lagos state in particular can be classified as not too complex. The popular-sized units are approximately an area of 75 sq m, creating an apartment for a 2 bedroom flat and 100 sq m for a 3 bedroom flat. These can be provided in a multiple dwelling unit of apartments up to four floors creating estates that are properly serviced with water, good drainage, roads, waste management and a sustainable design that would ensure good natural light penetration, adequate ventilation, orientation and natural water supply.

The cost per square meter for such a build needs to be curtailed to an affordable amount that is attractive for not just the experienced house builder/developer but the local landlords coming together to build a multiple of, for example, four housing units of four flats per floor on four floors creating a scheme that can accommodate up to 64 householders. In Lagos the small house builders are more popular and should be harnessed and encouraged to blossom into the medium scale developers. The culture encourages investment in bricks and mortar and most households who talk about investment mention the desire to build more houses or buy plots of land to build on. Housing estates of various sizes are springing up all over the state from Badagry to Epe. These estates have a captive audience of new arrivals onto the

property ladder who are keen to tap into the security offered by the gated development, shared drainage, water, roads, waste and other infrastructure costs.

In Lagos the informal property market is rife and it is important for the government and relevant ministries to encourage a proper registration of these properties to ensure that the underground nature of such developments are discouraged and finally eradicated. The danger of leaving these properties to be rampant is that they are grossly overpopulated, built poorly with poor facilities and rent is cheaper than in areas with good infrastructure.

The creation of the design brief, one of the first stages, in the design process, was investigated by (Watson, et al., 2000)and(Watson, 2004). In Watson et al.(2000) the hypothesis was stated as if the environmental criteria are set when the brief is developed there is a better chance that they will be included during the design development stages. The method was an action/reflection model of the design process for two case study houses, which was not described in detail. The research concluded that as predicted, when environmental criteria were included in the design brief the case study houses had a lower environmental impact. This research was continued in Watson (2004), where the model was developed and tested with empirical data from several case studies, to enable the certainty of the model to be better established. The study found that for design solutions to achieve the environmental performance level desired by clients, goals must be put in place as early as possible in the design process. (See modified RIBA Plan of work in Figure 3.1) Stages that need extra attention are highlighted stages C- Formation of project team, D- set and agree principles, E- design brief and M-procurement. (Beadle, 2008)The RIBA plan of work was adopted in the UK to help designers work to a process that can aid the realisation of a design in conjunction with other consultants and contractors.

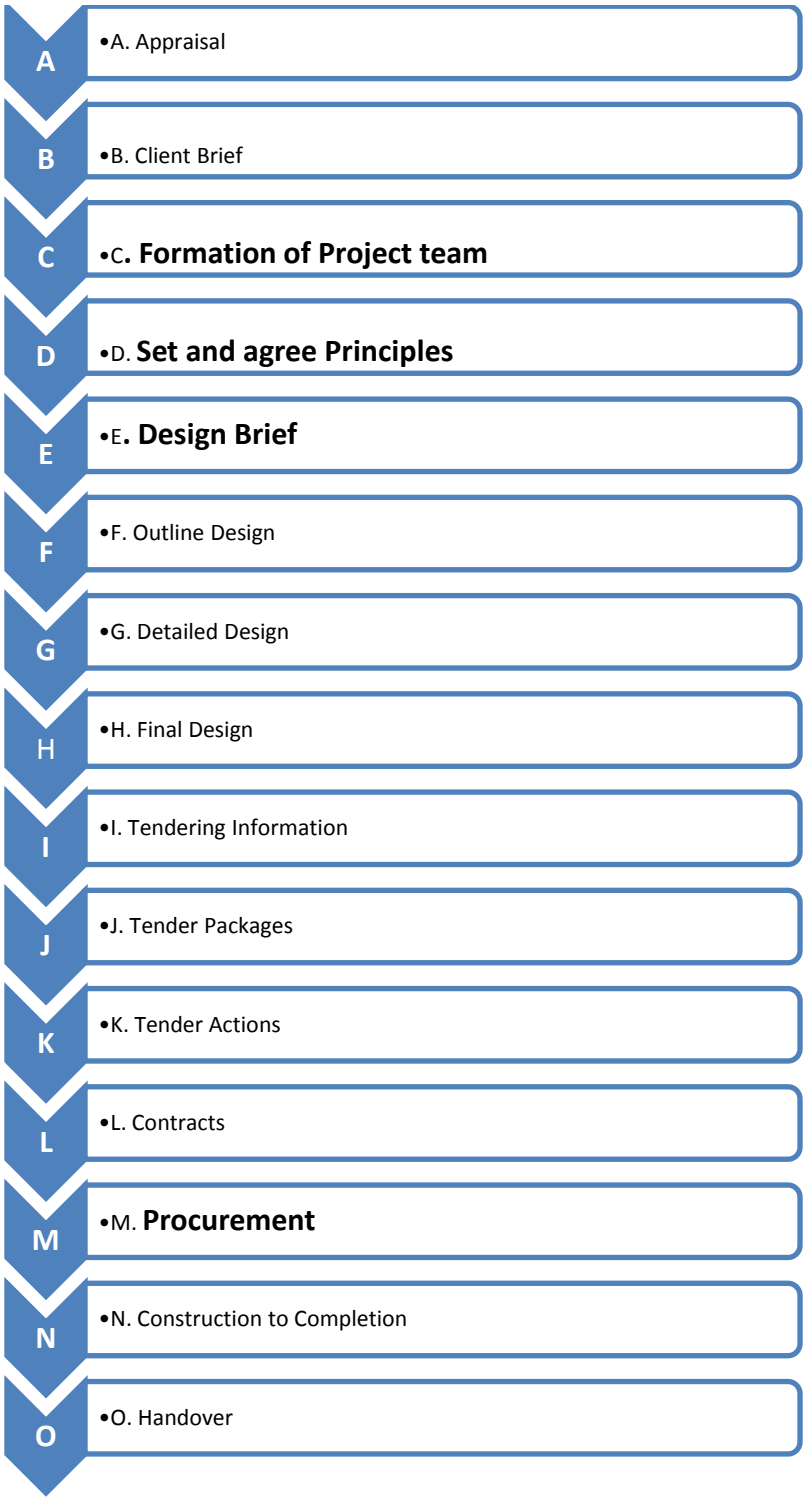


Figure 3.1- Model of the Design process to encourage the delivery of sustainable housing

Adapted from (Beadle, 2008)

3.06 Design Considerations

The Nigerian designers and architectural firms have a great part to play, as architectural firms can aid the development of a green tomorrow. As *80% of the sustainable design decisions* that affect a building's energy performance are made by architects, at the design phase. With gradual advancement in technology and engineering, Architectural firms can evaluate the energy performance of a building at the early stage of designing a building process (Brown, 2007).

This unique position is echoed internationally as in a study undertaken on the future for architects by the Royal Institute of British Architects (RIBA, 2010), architects were quoted as saying that they expect to be crucial to decision making and initiating the design of buildings for the future. As architecture is an art in which habitable spaces are created and a relationship between man and his environment is forged, it has logically become a discipline that at times embraces environmentally friendly strategies (Marmol & Radziner, 2008) it however should always embrace environmental strategies as its paramount to satisfying the design brief and the client. Ethics in architecture are essential, if the objective is to increase environmental awareness and create a sustainable world. (Chueca, 2009) The designers will invariably be a voice for the protection of the earth and its resources.

It is also important to note as designers what the locals term as development as noted by (Trager, 2001) who wrote "it seemed those in the academic and practitioner communities who are concerned about development needed to consider how people in their own communities define development and how they go about undertaking what they consider to be development projects. In the long run this is the way in which change and development takes place - by the involvement of people in their own communities."

The proper decisions surrounding sustainable design which should be made are as follows:

- Have we made a firm decision to follow an integrated design process, and are we making this process known to all potential proposers for design and construction services?
- Have we adjusted our expectations and budgets to reflect the nature of the integrated design process?
- Is this approach clearly stated in all requests for qualification sent out to the design and construction community? (Yudelson, 2007)
- The above questions will work favourably and will be promptly answered in a developed environment with accredited and well skilled and trained artisans. However in a state like Lagos state it would be difficult to have enough on a tender list as they are few and far between. It is

therefore imperative for the training and skills transfer to be high on the agenda to ensure we have a sufficient crop to choose from

Architects have a special responsibility to make buildings as efficient and robust as possible. The rate of demolition of the existing housing stock has slowed down over the past decade with the result that the typical house today will probably outlive its design life by a factor of three. The drive towards sustainability requires a new approach to housing design. There is a complex set of issues that requires an integrated, holistic approach from the micro to the macro scale and greater cooperation between designers, procurers and users (Turrent, 2013).

Energy-efficient and sustainable building materials and technologies offer many benefits to building owners and building occupants including but not limited to: Positive impact on local economy Energy conservation Improved occupant health and productivity (UN habitat, 2009).

The buildings from designers should have the following Design quality indicators (DQI) which are a process that enables every aspect of design quality to be assessed at each stage of the construction process, from inception to post occupancy analysis: DQI empowers stakeholders to be actively involved, through structured workshops and online tools, with construction and design professionals, to set targets against which to review design quality. The workshops are professionally mediated by an accredited DQI Facilitator.

DQI focuses the design and construction team on the needs of the end user with the following;

3.07 Functionality

The building should be able to accommodate the user's needs
The building should contribute to the efficiency of the organisation or family
The building should enhance the activity of people who use it regularly
The building should provide good security
The building should be adaptable to changing needs
The lighting should allow for different user requirements
The layout should allow for changes of use
The heating, ventilation and IT installations should allow for changes of use
The structure should allow for changes of use

3.08 Access

There should be good access to public transport

There should be sufficient car parking

The building should provide good access for all

The building should cater for cyclists

The layout and landscape around the building should provide good access for people

There should be safe and secure access for goods

The layout should be intelligible

It should be easy to find your way around the building

The signage should be clear

The building should cater for the needs of people with impaired sight

The building should cater for the needs of people with impaired hearing

The building should be accessible to physically challenged people

3.09 Space

The building should be the right size for its functions

The buildings layouts and the relationships between rooms should work well.

The circulation space should work well

The ratio of usable space to the total area should be good

The buildings layout should provide a good balance of communal and private spaces

There should be adequate storage space

3.10 Build Quality and Performance

The building should be easy to clean

The building should withstand wear and tear in use

The building should be easily maintained

The building design should respond to the site microclimate

The building should weather well

The buildings structure should be efficient

The buildings finishes should be durable

There should be sufficient daylight in the building

There should be sufficient artificial lighting levels in the building

The thermal climate in the building should be appropriate to its use

The acoustics quality should be appropriate to its use

The air quality should be appropriate to its use

The building should be easy to operate

The building should produce few complaints/faults

3.11 Engineering

The building should be energy efficient

The components in the building should be easily replaced when necessary

The engineering systems should work well

The engineering systems should be easy to operate

The engineering systems should operate quietly

The building and engineering systems should be designed to minimise CO2 emissions

The requirement for heating should be minimised by the design of the building

The design should minimise the requirement for mechanical ventilation

The design should minimise the requirement for cooling

The design should minimise the requirement for building control systems

The building control systems should work well

There should be a clear fire safety strategy

Engineering systems should be well co-ordinated

The building should be healthy to use

The building should be safe to use

3.12 Construction

The materials should be appropriate for the buildings purpose

The methods and materials used in construction should have been well thought through

The building should be designed so that it can be safely constructed

The building should be designed for demolition and recyclability

The layout, structure and engineering systems should be well integrated

The buildings fittings and finishes should be well integrated

Future climate change should be considered in the design of the building

3.13 Character and innovation

The building should provide a sense of security.

The building should lift the spirits

People should want to visit the building

The building should reinforce the image of the occupiers organisation

The building should be widely acclaimed for its quality

The building should have character

The building should make you think

There should be a clear vision behind the building

The building's design and construction should contribute to development of new knowledge

3.14 Form and materials:

The shape of the building should be pleasing

The building should be well composed

The building should take advantage of its orientation on site

The forms and materials should be well detailed

The materials used in the building should add to its quality

The use of colour and texture should enhance the enjoyment of the building

3.15 Internal environment:

The building should be a pleasure to use

The building should not feel cramped or overcrowded

The building should reduce stress for the users

The circulation spaces and common areas should be enjoyable

The natural light in the building should be of high quality

The artificial light in the building should be of high quality

The indoor temperature of the building should be comfortable in all seasons

The indoor air quality should be pleasant

The building should have good acoustics

The building should provide good views

The level of personal control of the internal environment should be appropriate.

3.16 Urban and social integration:

The building should be sited well in relation to its context

The area immediately outside should be pleasant

The landscape around the building should enhance the quality of the neighbourhood

The building should be well located in relation to local facilities

The people in the neighbourhood should enjoy the building

The building should contribute to the neighbourhood

The building should stimulate social and economic regeneration. (Office of government commerce, 2011)

3.17 Assessment Methods

(Trusty, 2001)divides assessment systems and tools into three levels as follows:

Level 1 - Product comparison tools and info sources (e.g. BEES)

Level 2 - Whole building design or decision-support tools (e.g. Eco-Quantum, Envest)

Level 3 - Whole building assessment frameworks or systems (e.g. BREEAM, GBC)

Level 1 - Product comparison tools are used at the procurement stage. They may include economic as well as environmental data. They may have a life cycle analysis in the background or they can be used to construct LCA.

Level 2 - Decision-support tools have a narrow focus, like environment, cost or operating energy. They are objective, used by design team members and may involve weighting or scoring. They provide input to level 3 tools.

Level 3 - Whole building systems tools have a broad coverage: environment, economic or social. They mix objective and subjective data and use scoring or weighting systems. These tools may apply to new design or existing buildings. They may require external auditors and may yield certificate or label.

3.18 The Code for Sustainable Home

The sustainability code in the UK has also been newly created to enable a sustainable development that would minimize high carbon production. In its possible creation in Nigeria it would be required to be flexible and collaborative in its delivery approach. The 9 key areas are similar to what prevails in Nigeria and some item are more crucial than others. For example the Energy and CO2 emissions are a major issue in Lagos. This is due to the numerous numbers of generators that are utilised by the residential as well as the commercial sectors to provide power. Another thorny area would be the building materials used especially cement used in very large quantities. The other 7 key areas can be resolved easier once the planning is commenced early.

Launched by the Government in 2007, the Code for Sustainable Homes replaces EcoHomes as the National standard to be used in the design and construction of new-build residential properties in England. The code is a set of sustainable design principles covering performance in 9 key areas: 1.) Energy & CO2 emissions, 2.) Water, 3.) Materials, 4.) Surface water run-off, 5.) Waste, 6.) Pollution, 7.) Health & well-being, 8.) Management, 9.) Ecology. The code uses a rating system of 1-6 stars and involves a Design Stage Report and a Post Construction Report which is submitted to the Building Research Establishment to provide a final code certificate. Formal code assessment of new-build dwellings can only be carried out by a suitably qualified licensed and registered, Code Assessor. Developers wishing to lead the field in sustainable development will want to have their developments assessed under the code as soon as possible in the project life cycle to achieve as high a code as possible (Department for communities and local government, 2007).

These codes need to be adopted by the developing countries like Nigeria and even though they are beginning to realize the importance of sustainable development it is been difficult to get out of the starting blocks due to other more pressing issues like rapid development of slums, transportation and ensuring reduction of building collapses prevalent in the country as an outcome of poor adherence to existing policies and codes. There is therefore a need to police the builders further and also to weed out corrupt practices amongst the officials, as a result of slack supervision and unprofessional conduct at different levels.

The code focuses on how these problems highlighted can be tackled right from the onset in the design aspect before the building gets to the construction phase. Analysis of existing regulations indicates that developing countries need to ensure that these requirements are adhered to as long time development can

only be sustained if the design and materials are coordinated adequately with the right supervision for an efficient delivery. Inefficiency is the bedrock of failure in trying to create a guideline.

Five elements of the principles of sustainable development that are advocated (Vanegas, 2003)(Sev, 2009)(Redclift, 2005) and which will be explored further in this research include: the selection of durable and sustainable materials that meet defined standards of compliance; appropriate site selection; use of flexible and durable designs; proper planning and management of construction activities; and proper commissioning of building systems and equipment before occupation (Windapo & Rotimi, 2012).

It should be borne in mind that housing quality can be measured by quality of construction material of the floor, walls and roof of dwellings. Lower quality is taken as dwellings where the outside walls are constructed with mud, wood or bamboo, iron sheets or cardboards; where floors are constructed with earth or mud, plank, dirt or straw; and where roofs are constructed with mud or mud bricks, wood or bamboo and thatch grass or straws. Substandard houses are common in informal settlements; slums or deteriorating neighbourhoods; traditional core of many organic town/cities; with equally poor and deteriorating neighbourhood services and infrastructure. Unfortunately, lower quality housing often requires high maintenance cost ratio, which serve to drive up the housing expenditure of households living in such housing. Housing that is located in neighbourhoods lacking basic infrastructure such as pipe borne water, electricity, waste disposal, roads and sewer drainage, often transferred the burden of providing alternatives to such infrastructure/services at additional costs to homeowners and landlords. For instance, a lack of pipe borne water facility often drives house owners to construct water wells or water boreholes (where possible); build surface water tanks or over-head water tanks that are routinely filled by water bought from vendors, which requires large capital outlay and expenditure. In rented housing, such extra costs are often transferred to renting households -adding to their housing expenditure levels. Thus, the cost of living in such housing in many case ends up being more expensive than living in neighbourhood with relatively better services (Ndubueze, 2009).

Adequate design will improve production taking cognizance of locality and culture. There is waste generated in energy, in developing countries inadequate power supply, an influx of individually generated power from home owners. The desire to create a thermal environment that would satisfy the human body condition has created the need for air conditioners in every room in the house, This is obviously not viable for sustainable housing. Good design and usage of materials would eliminate this and make the house more affordable to run and maintain. Shared water supply source would negate the need for each home to have a borehole and a shared filtered ground source would supply a maximum number of

householders creating a good economy of scale in delivery. A mix of climate appropriate design will make the delivery better and reduce running costs of buildings. Solar orientation of buildings to allow good cross ventilation, reduction in water usage, rainwater harvesting techniques and good sanitation are some of the all-important infrastructure and service requirements.(Max Fordham, 2012). Reduced dependence on fossil fuel use lies at the heart of sustainable design. Energy efficiency in new housing can be improved significantly beyond the requirements of current building regulations at no great additional cost. (Turrent, 2013) The primary function of all buildings is to adapt to the prevailing climate and provide an internal and external environment that is comfortable and conducive to the occupants. However, in this era of climate change and global warming, providing comfort for the occupants of a building is quite challenging and very fundamental (Akande & Adebamowo, 2010).

Table 3.1: Quantifiable criteria for building Regulations, Eco-Homes Excellent and levels three to six of the Code for Sustainable Homes (Beadle, 2008)

Criteria	Building regulations			EcoHomes	Code for Sustainable Homes			
U-Values(W/m²K)*approx	1995	2002	2006	Excellent	3	4	5	6
Walls	0.45	0.35	0.28*	0.24*	0.22*	0.19*	0.14*	
Floors	0.35-0.45	0.25	0.20*	0.17*	0.16	0.14*	0.10*	Zero
Roofs	0.20-0.25	0.16-0.25	0.15*	0.13*	0.13*	0.10*	0.075*	Carbon
Windows	3.0-3.3	2.0-2.2	1.8*	1.57*	1.57*	1.25	0.9*	
C02 Emissions (kg/m²/yr)			29*	≤25	23*	20*	14.5*	0
NO level (mg/kWh)				≤70	≤70	≤40	≤40	≤40
Boiler efficiency			≥86					
Renewable energy (% of Demand)				10	15	15	15	100
Water consumption (liters/person/day)*approx				≤96*	≤105	≤105	≤80	≤80
Timber certification (% from Temperate forests)				75				
Materials responsibly sourced (%)					80	80	80	80
Density (% of dwellings at floor					100at	100at	100at	100at
Area: footprint ratio)				80 at 2.5:1	3:1	3:1	3:1	3:1
Sound insulation (Tests at dB level Higher and lower than Building Regulations)				3	5	5	8	8
Private space (m2/bed space)				1.5	1.5	1.5	1.5	1.5
Cycle storage (% of dwellings)				95	100	100	100	100
Surface run-off reduction (%)				50	50-	50-	50-	50-100*
*depending on area					100*	100*	100*	

3.19 Environmental sustainability and poverty

Environmental sustainability is at variance with poverty. It is difficult to endeavour to participate actively when more pressing needs have not been met. Poverty in the metropolis has a major effect on the psyche of the inhabitants. In most countries of the world, especially in the developing world, urbanization has become an integral part of the growth and development process. Unfortunately many developing countries, including Nigeria, are still experiencing urbanization and its associated problems, which they hardly can control or manage. This situation is made worse by the decreasing economic incomes and spiralling external debts of many developing countries attendant upon fiscal austerity or budget constraints which compound most governments burden of expanding and upgrading infrastructure and social amenities (Olorunfemi & Raheem, 2008).

Environmental degradation and poverty are inextricably intertwined, resulting in a vicious cycle in which poverty causes environmental stress, which in turn perpetuates more poverty. When the physical environment in and around cities deteriorates, those most affected are the urban poor (Oduwaye & Lawanson, 2007). Shelter needs to be built in the right sector using locally available materials that the occupiers are familiar with. This would aid proper maintenance culture and ownership of repairs and upkeep of the building. The knowledge transfer system adopted needs to work in a way that would be beneficial to the development of the area both in terms of training of artisans and developers but also creating employment that is also sustainable by virtue of the facility maintenance arm that comes of the back of new development.

This is also where designers from the onset need to be actively involved in the manufacturing process. It seems designs produced now are detached from what goes on onsite especially in an area that has not being tested by time. Where the understanding of local material is devoid there are bound to be problems occurring. The design is incongruent with the need and the detailing is unaware of the skills available. Hence it creates a misnomer and causes even more havoc long term than its trying to eradicate. As cases are seen where properties are left uncompleted or allowed to decay when it is not practical for the users.

This is why community-developed schemes became more popular to ensure that the house where built by the people for the people. Government does need to play a key role in ensuring that all the challenges that could prevent this occurring at the required pace are removed. Architects can do much to help achieve sustainable housing by using their design skills to create higher density mixed use neighbourhoods utilizing smaller urban sites than normally considered viable by volume house builders. In the process,

energy, water and material use can be reduced by applying specific not standard solutions to housing problems (Turrent, 2013).

Today's Nigerian city, according to (Mabogunje, 2004) is typified by substandard and inadequate housing, slums, and lack of infrastructure, transportation problems, low productivity, crime and juvenile delinquency. Poverty is also endemic in Nigerian cities. While available statistics put the national poverty level at 70% as at 2004 (UNDP), a number of real indicators show that the current poverty level is actually higher than that.

Lagos represents the epitome of urban decay. The metropolis is replete with environmental problems ranging from slums and squatter settlements, to crime and delinquency. As far back as 1984, 42 settlements had been identified as blighted (UNCHS/Lagos State Government). The number has risen to about 100 as at 2004 (UN-Habitat/Lagos State Government).

Poverty can be said to refer to specific forms and levels of deprivation, which impose major limitations on normal human functioning and existence. (Akinyele, et al., 1994) Poverty is inseparably linked to lack of control over resources including land, skills, knowledge, capital and social connections. In 1995, 38% of people lived in urban areas, and this is projected to rise to 52% by 2020. (United Nations Secretariat, 1996). Is the urban share of poverty also likely to grow? There is evidence that it has been doing so (Haddad, et al., 1999).

3.20 What is the preferred sustainability environment?

This a scenario where local building materials are improved upon and are readily available and cheaper due to the fact that they are sourced locally and can offer even better quality than what we are using at the moment because it is been well researched upon.

As indicated in figure 3.2 The building life cycle needs to be raw materials extraction and processing - Manufacturing - Packaging and transportation - Performance - Use and Maintenance - End of Life (disposal/recycling/reuse) (Meadows, 2012).

There is a need for greater interaction and communication between policy, research and practice. The Government needs to be more proactive to create an enabling environment for improving the building codes and its proper implementation. This can be achieved by participating with the research and private

sectors to create a sustainability code suitable for Nigeria that would highlight the beneficial aspects of the materials used in terms of energy efficiency and reduced costs (Olagunju, et al., 2012).

In an architectural context, sustainability is defined as a term that describes economically affordable, environmentally healthy, and technologically efficient and high performance buildings (Edwards, 2005) ; (Attmann, 2008).

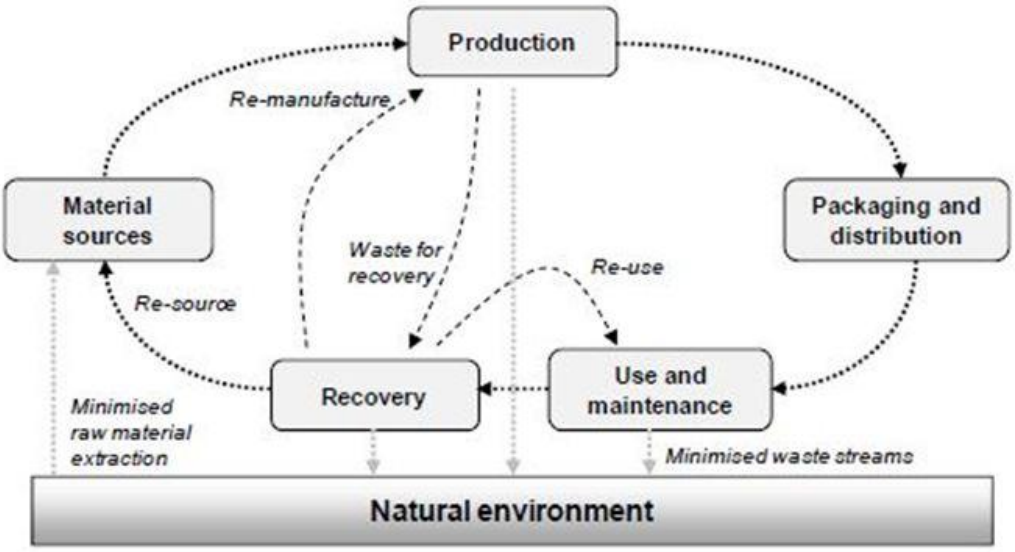


Figure 3.2: The closed loop production system

(Meadows, 2012)

This is opportunity created for manufacturing industries to blossom in these areas using local materials as their raw material to produce prefabricated panels for external and internal walls. Iron ingots sourced locally form the basic raw material for the steel panels, ironmongery and nails etc. used for the construction works. Where straw and hay planted locally forms the roof and insulation in the walls and roof to reduce solar heat gain. Where the timber from the local forest adequately resourced is used for the windows, doors and wardrobes in the scheme. The formwork is local timber recycled for further use and the scaffolding is the bamboo from down the road also being recycled. The labour in the factories is the local people being trained, to harness and gather raw materials locally. The carbon footprint in transportation is drastically reduced. Also the local sand and gravel is sourced from quarries close to the plant and packed in lift able quantities of no more than 25kg each for easy carriage and transportation.

Most products, however complex and whatever their size, are presently delivered through industrialized strategies and technologies. There is no valid reason not to apply the same strategies and technologies to

the delivery of urban housing. Industrialization is first and foremost a mathematical equation: a generic organisation will aim at a large market (quantity) to amortize the initial investment in a process capable in return of simplifying the production (economy) in order to offer an affordable and diversified product to the large majority of people (Richard, 2010; Kersey, 2004).

While the increasing rate of urbanization is inevitable in Nigeria, the circumstances under which the urban population is growing have wiped out most of the associated gains. The context within which urbanization is taking place is creating a host of problems far beyond the managerial and fiscal capacity of the municipal government.

3.21 Findings from literature review

The designer's role continues to be paramount in the drive to reduce carbon footprint. The designers are the visionaries as has been stated and are also the overseers of the works on site which is where the problem is? The best designs can be on paper but it needs to be properly implemented on site to meet the building regulations. However it is likely that most people see not architecture but the building industry and feel detached from it (Pearman, 2014). In the UK, the RIBA launched its built environment report, 'Building a Better Britain; a vision for the next government'. This underlines how architecture affects all our lives and sets out how practical policy changes can have wider and positive impacts on our health, wealth and general well-being. Key areas of policy have been identified such as planning, housing, flooding, school provision, health and ageing, and retrofitting - that need greater investment and intervention to deliver economically, socially and environmentally sustainable homes and communities to meet the needs and aspirations of the British public. A number of recommendations are therefore offered to both local and national government (Hodder, 2014).

Smart house technology is being bandied as the panacea to the sustainable design carbuncle however it needs to be part of a cohesive plan to ensure an outcome that would be appreciated by all. Allowable solutions are being recently introduced. It is described as the third component of the zero carbon pyramid, with fabric energy efficiency and low carbon energy use on site and any residual emissions offset by delivering them off-site (King, 2014).

The design process comprises a series of decisions that are made by the project team. Every aspect of a building is determined by these decisions, as they specify each detail of the building fabric, services and construction techniques and therefore dictate overall building performance. Numerous factors influence

decision making in the design process, but can be categorised into three main areas that relate to sustainable development: economic, social and environmental (Beadle, 2008).

(Riley, et al., 2003) Investigated the role of the contractor in the US construction industry in delivering sustainable buildings, including their power over the procurement process. Twenty case studies of green buildings in the US and 40 interviews with professionals working in the construction industry were analysed to assess this influence. The study concluded that contractors have both the potential and the responsibility to enhance green building project teams and that this potential can only be realised if they are involved in the design process during the early design stages. The study reported that efforts to become more sustainable also create incentives to adopt logical and much needed improvements to the traditional sequential design and construction process stating that sustainable building practices should be referred to as sensible building practices to encourage their incorporation into the mainstream.

Sustainable housing and the way forward is the national debate as the populace and government realise that shelter is key to any countries growth and development. It is notable that the Lagos state government has commenced a drive to provide more housing units and also plug into the newly introduced Mortgage finance and national housing fund. The awareness needs to grow among the populace that this is a package for everyone. Historically housing in Lagos state has been segmented and some sectors have been made to feel undeserving or marginalised. All the circumstances working against the poor and the masses should be examined, reviewed and removed. All criteria for building successfully are against the poor and the low income earners, no collateral, no access to viable loans, extremely low income, and high cost of building materials and so on. Except the poor are properly defended or shielded, they may remain homeless and marginalised for life (Aluko, 2011). It is so apparent to them that they end up living on the fringes without being able to come unto the main fray and contest for their rights amongst the general populace. It becomes a self-actualizing prophecy in that they are called squatters on land and become nomadic in their nature moving from area to area. They move when the owners of the land commence development and sometimes the owners leave them on the land to assist in keeping the land from getting into the wrong hands. They are recognized squatters who are easily evicted from the land when the owner/developer decides to commence works. This group of people are lowest on the food chain and hence the housing ladder. They have no constant means of income and forage on what they can get on a daily basis. The present government has no allowances within its remit to cater for this group and they are left to their own devices and means to fend for themselves. In providing shelter for the poor, the governments in the region have been unable to meet the demand from the urban population for housing.

The inadequacy in shelter delivery system in Lagos to cater for the urban Population has led to an extensive development of squatter or unplanned settlements (Morakinyo, et al., 2012).

The operation of buildings within the built environment has major impact on environment. Important decisions, that have consequences over a long life span, are made already in the design phase (Huovila & Curwell, 2007).
For example an affordable house design methodology was used to develop vernacular architecture to minimize cost and environmental impacts, while maximizing the social acceptability in housing projects for low-income earners in Kish Island (Afshar, et al., 2012).

3.22 Summary

Lagos has what you might call rungs of housing as follows:

The outright home owners
The partial home owners (mortgage, etc.)
The Renters in high brow
The renters in low brow
The Squatters

It's critical for the housing policy to cater for all the above mentioned groups of people as they form the complete strata of the population. It is a pyramid, as there are so many at the bottom in the lowest segment. Even though this is usually the case everywhere but the disparity is so much more obvious in Lagos with a teeming population and limited land area for building and development. Lagos also harbours landlords with a number of properties being rented at overly inflated prices.

The objective always has to be people centred and focused on ensuring a better lifestyle and easy means of shelter provision for the vast majority of the indigenes. It is imperative that this is achieved with the views and user requirements in mind. The relevant information has been gathered through the literature search on design, technology and sustainability impact from the user's viewpoint and their interrelationships. This helped in establishing the current body of knowledge and gave information and insight into the prevailing problems. Climate responsive design skills and strategy will aid the production of zero energy buildings. The literature review has revealed that a holistic decision making process involving present and projected environmental and socio economic conditions over time. Also designing

for sustainability making eco friendly decisions via efficiency and moderation in the use of materials, energy and space is required.

Government need to give incentives to the developers and self-builders to use local materials as opposed to what they have been used to for years. Incentives would include, tax incentives, government subsidies, import duty relaxation and amendment of land use laws. The designers are primarily responsible for the outcome, extra responsibility is placed on the designers to ensure that the policies in place are commensurate with what will enable a suitable environment for the inhabitants and would also correlate with their design intentions. It has become the duty of the designers to drive the direction and focus of policy otherwise the direction will not be relevant to the people in whom it applies.

CHAPTER 4: METHODOLOGY

4.00 Introduction

The basic hypothesis of this study is that inappropriate design and technology are the major cause of inability to provide shelter for the low income households.

In fulfilling its aim and objectives, this study has utilized secondary and primary data from Nigeria. A survey questionnaire was conducted amongst the occupiers of low cost housing projects. Non-parametric procedures and tests were used to analyze the data collected.

Ethical procedures were adhered to and the researcher ensured the following:

- Results are accurate, complete and fair and will be ethically used
- Stakeholders participating in research activities are respected and protected
- Individuals collecting data are respected and protected.

4.01 Research Philosophy

When undertaking research of this nature, it was crucial to consider different research paradigms and matters of ontology and epistemology. Since these parameters describe perceptions, beliefs, assumptions and the nature of reality and truth (knowledge of that reality), they can influence the way in which the research is undertaken, from design through to conclusions. (Flowers, 2009) Ontology is described as 'the science or study of being' and develops this description for the social sciences to encompass 'claims about what exists, what it looks like, what units make it up and how these units interact with each other.' (Blaikie, 1993) Epistemology considers views about the most appropriate ways of enquiring into the nature of the world (Easterby-Smith, et al., 2008) and 'what is knowledge and what are the sources and limits of knowledge' (Eriksson & Kovalainen, 2008).

As the research interest encompasses many areas in the built environment ranging from design, technology, building materials to housing. The research philosophy emanated from a belief that the information for the housing framework can mainly be gathered by liaising with the community and relating with them closely over a period. The research learnt from Bronfenbrenner ecological theory which focuses on community and the fostering of school, family, individuals and peers in the micro system. The research suggests that the development of the community creates a better family unit. The research methodology was influenced by this philosophy and the amalgamation of positivist and realists.

It’s important to note that nominal ontology and its accompanying epistemology realise more explanatory success. There are mainly three types of paradigm to understand the reality, positivism, interpretivism and realism. The concept of positivism is directly associated with the idea of objectivism. In this kind of philosophical approach, scientists give their viewpoint to evaluate social world with the help of objectivity in place of subjectivity (Cooper & Schindler, 2006). The philosophical approach of Interpretivism the research give importance to their beliefs and value to give adequate justification for a research problem. Researchers use small sample and evaluate them in detail to understand the views of large people (Kasi, 2009) A direct realism approach was used here which concentrates in the reality and beliefs that are already exist in the environment. In this philosophical approach, the approach selected of direct reality is what an individual feels, sees, hears etc. (McMurray, et al., 2004).

The researcher was responsible for establishing mechanisms to ensure that the design of the questionnaire and following activity responded appropriately and the implementation of the design was monitored and there was a process for determining an adequate response to any negative incidents. Talking with occupiers seeing and feeling the problems first hand and getting a pulse of the problem was essential. This initial exercise allowed the drafting up of pertinent questions that hopefully helped to elicit or solicit the right answers.

The analysis was done from a thorough examination of the data collected using the latest software such as Chi-test, ANOVAs, Spearman’s Rho and SPSS. The philosophy has informed this methodology which has enabled us select the methods used. Qualitative analysis of archival materials, publications read for the literature review revealed the gaps and highlighted cogent issues. Also the pilot studies done helped to ascertain the direction of the research and which methods to pursue tenaciously. The data collected from the questionnaires distributed in the case study areas were analysed and the results and attributes were further discussed in a focus group. Further interviews also done with a select group of professionals and stakeholders helped to cement the parts together.

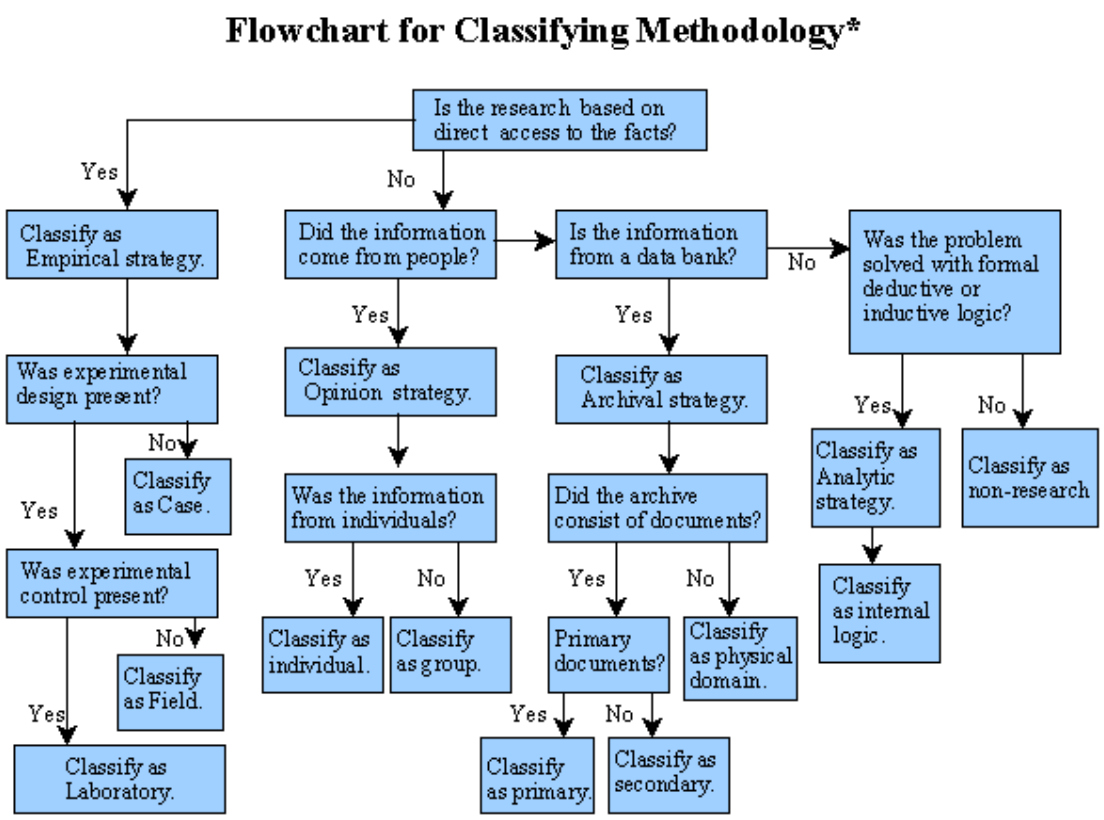


Figure 4.1 Flowchart for classifying Methodology

(Buckley, et al., 1976)

A flow chart for classifying methodology was devised by adapting Figure 4.1. It ensured that the process was adhered to and the research route taken followed a course in line with the need for a pure academic study.

Figure 4.2 flowchart has enabled the gaps to be identified following a rigorous literature review which highlighted a number of deficiencies and shortcomings. The following pilot study/case studies and field studies buttressed the literature review and analysis of the data collected revealed findings that allowed a framework to be developed and subsequently validated in a focus group. Conclusions were finally drawn up with recommendations.

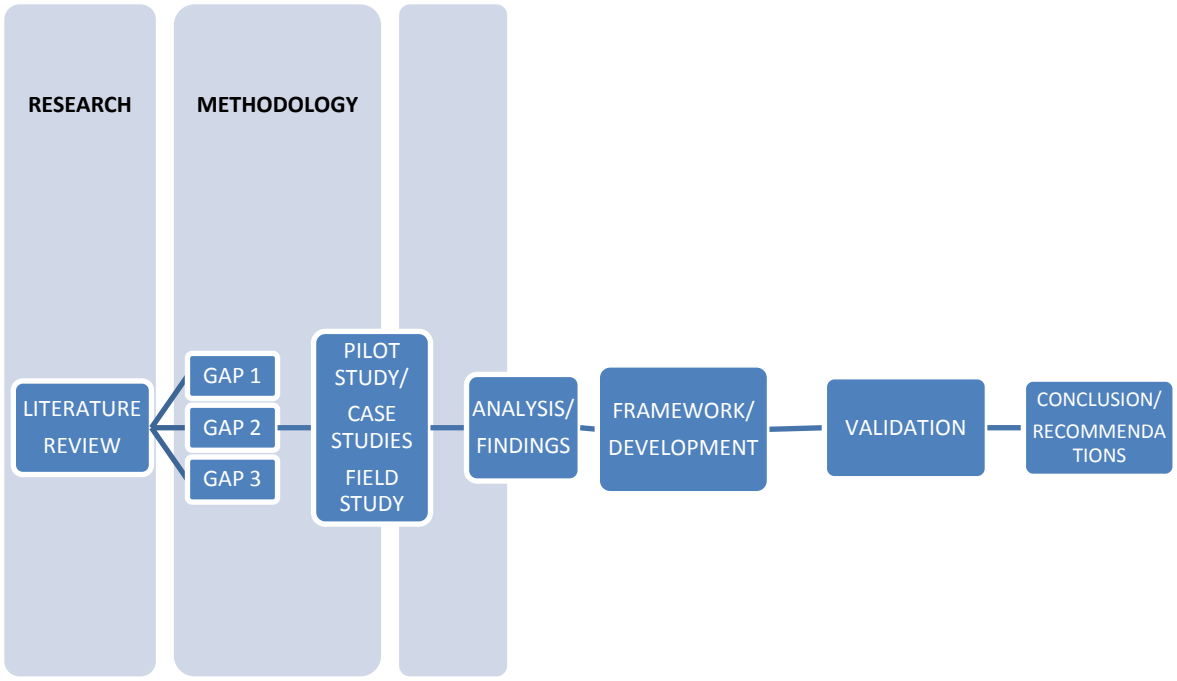


Figure 4.2 Flowchart highlighting the gaps

4.02 Gaps Identified

GAP 1

Finance – A lack of funds at affordable rates to galvanise the housing market. The mortgage market needs a boost from the banking sector.

GAP 2

Design – a) There needs to be new innovative designs being carried forward, suitable for the environment and culture we are in. It needs to be on a massive and sustainable scale that can be easily replicated without too many complications. Sustainability in the Nigerian context relates to a southern climatic realization of zoning which affects the cultural and social values of the people. For example the Yoruba in the south west build their houses in a particular manner which relates to the ethics, values, behavioral pattern and language of the people. The mud for the huts is readily available so also is the thatch for the roof. The necessary skills have developed over time based on demand and necessity.(Olagunju, et al., 2013)

b) An improvement on the Research and development aspect of the building industry.

GAP 3

Policy

a) Policy formulation must be centered on national interest. While designing policies that will promote investments and trade, indigenous businesses must not be exposed to harsh and unfair competition from better advantaged foreign peers

b) The present government policies are obsolete as you can't have old policies solving new problems. There needs to be a visionary awareness of the future and what will be the driver in ten to twenty years to ensure that its relevant to the people for a while

4.03 Research methods

The research methods used as derived from the methodology (also see Figure 4.3and 4.4 below) and the underlined philosophy are as follows:

1. Literature review

2. Interviews with government officials, Lagos State government, developers, private developers, charity developers, parastatals e.g. LSDPC, LNTDA (Lagos New Towns Development Authority).

3. Qualitative analysis of archival materials, publications of the Lagos State Government and its agencies, and other secondary data related to the case-study, including available census data. In addition, primary data was obtained through participant-observation; the researcher purposively spent time within the Lagos metropolis in 2011 and 2012 to observe and record the state and quality of physical and social infrastructure. Pictures were taken of the infrastructure and its condition. Interviews with relevant personnel directly privy to the situation. (SEE APPENDIX E) These were reinforced by residual memories of experiences derived from an early childhood in the Lagos of the 1970s and 80s. These research techniques were complemented by a review of literature on urban sustainability and mega-cities. The analysis of this body of data provides the evidence that justify how the Lagos housing project has become imperative, and the basis for proposing the application of sustainability principles to this housing reality.

On the other hand, both Heuristic Research (Moustakas, 1990) and Intuitive Inquiry (Anderson, 2007) are constructivist in epistemological stance, incorporating objective and subjective data in order to provide inter-subjective interpretations that rely on the researcher's intuitive understanding of the findings.
Heuristic inquiry is an extremely demanding process, involving disciplined self-commitment, rigorous self-searching and self-reflection, and ultimately a surrender to the process (Hiles, 2001).

The data used in this study is derived from a qualitative and quantitative research strategy.

- Lagos was chosen as a strategic location in the southwest and a major hub. This was due to its population, diverse cultural mix and the fact that it encapsulates the major variety in the country as a whole. The environmental, social and economic challenges the population is facing is also a factor. (Oyelaran-Oyeyinka, 2006)(Adegoke, 2010)(Asojo, 2010)(Ibem, et al., 2013). The primary data was sourced from structured and open interviews between September 2012 and December 2012. Respondents were sourced from a purposive sampling of senior government officials of the relevant ministries and local councils in Lagos state. The choice of structured and open ended interviews was to guide the interviews, elicit appropriate responses as well as allow for the addition of new and related questions when appropriate.

The secondary data was sourced from newspapers and journal articles, published reports on public housing in Nigeria, housing brochures as well as online databases of government agencies. A combination of content analysis of the transcripts of the interviews and descriptive statistics was used in the data analysis, while percentages and tables were employed in describing and presenting the data.

Also for further analysis and Interpretation of this research the quantitative and also qualitative methods have been chosen.

The quantitative research approach offers results in precise measurements and tends to be good for confirmation and deduction. Determining the relationship between one and the other is usually achievable. It is found to be good for knowing how many or how much, as some data is in the form of numbers and statistics. Quantitative research is objective and seeks precise measurements & analysis of target concepts. It is been employed for the user's surveys and questionnaires as it is more efficient and able to test hypothesis.

Qualitative – As this is usually recommended during the earlier phases of the research project, (Neill, J

2007) the design emerged as the study unfolded. The data is in the form of words, pictures or objects. Qualitative research is subjective and individual's interpretation of events is important, e.g. uses participant observations and in depth interviews. The qualitative method is also richer though time consuming, but less able to be generalized. The case study type of qualitative was also selected. (Creswell, 1998) defines the case study as an exportation of a bounded system or a case (multiple cases) over time through detailed in depth data collection involving multiple sources of information rich in context. Some consider "the case" as an object of study e.g. (Stake, 1995) while others consider it a methodology e.g. (Merriam, 1998). According to Creswell, the bounded system is bounded by time and place and it is the case being studied.

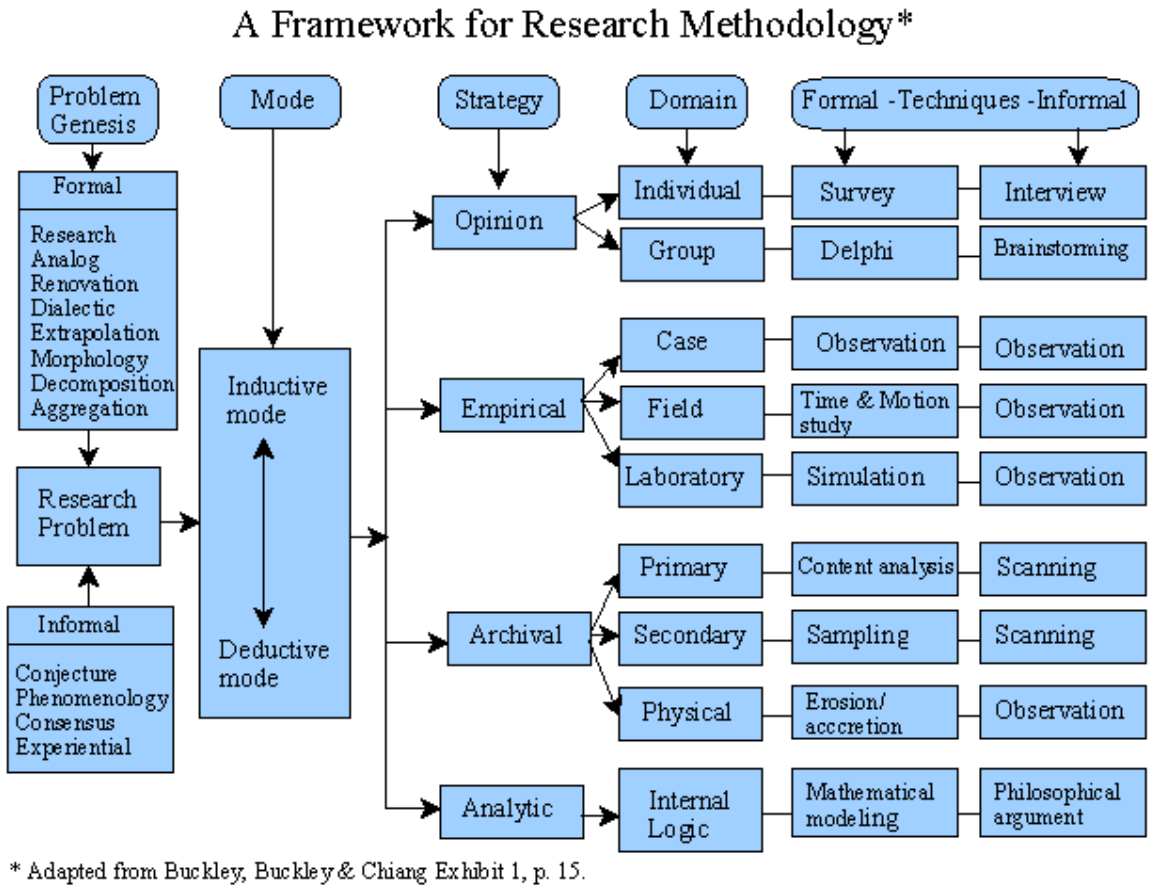


Figure 4.3: A Framework for Research Methodology

(Buckley, et al., 1976)

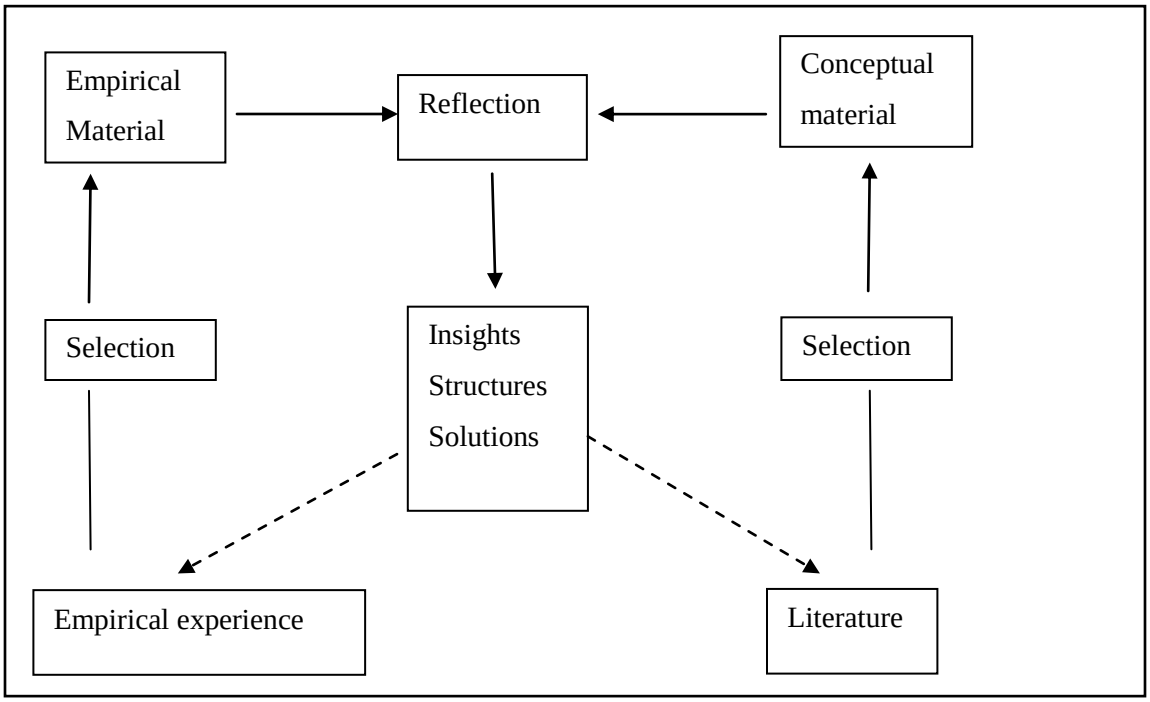


Figure 4.4: A model of research emphasizing the twin inputs
(Taylor, et al., 2009)

4.04 Theory Research

The 2nd hypothesis is that since housing demand is a function of affordability i.e. household income, price of housing and price of all other goods, therefore low income households have no effective demand for the housing which is being provided under the current policies.

Ecological systems theory impacted the education of disadvantaged and marginalized sections of society. Hence it suits an area requiring sustainable housing in a developed country.

"The ecological perspective uses ecological concepts from biology as a metaphor with which to describe the reprocity between persons and their environments...attention are on the goodness of fit between an individual or group and the places in which they live out their lives" (Sands, 2001).

The ecological perspective can be traced back to biological theories that explain how organisms adapt to their environments.

In 1868, Ernst Haeckel voiced the term "ecology" to refer to an organism and it's interdependencies within a natural environment. The most conventional definition of the term "ecology" means "the interdisciplinary scientific study of the living conditions of organisms in interaction with each other and with the surroundings, organic as well as inorganic" (Naess, 1989).

Bronfenbrenner's Ecological Theory (1979) holds that 'development' is influenced by several environmental systems. The theory identifies five environmental systems. The five environmental systems are:

- ***"Microsystem:*** This refers to the immediate surroundings of the individual. These contexts include the person's family, peers, school, and neighbourhood. It is in the microsystem that the most direct interactions with social agents take place; with parents, peers, and teachers, for example. The individual is not merely a passive recipient of experiences in these settings, but someone who actually helps to construct the social settings.
- ***Mesosystem:*** This refers to the relations between the different microsystems or connections between contexts. Some common examples are the connection between family experiences and school experiences, school experiences to church experiences, and family experiences to peer experiences. For example, children whose parents have rejected them may have difficulty developing positive relations with their friends or peers.
- ***Exosystem****:* Is concerned with the connection between a social setting in which the individual does not have an active role and the individual's immediate context. For example, a wife's or child's experience at home may be influenced by the husband's experiences at work. The father might receive a promotion that requires more travel, which might increase conflict with the wife and affect patterns of interaction with the child.
- ***Macrosystem****:* Describes the culture in which individuals live. Culture meaning the ways of people. Cultural contexts would include socioeconomic status, poverty, and ethnicity.
- ***Chronosystem:*** Refers to the patterning of environmental events and transitions over the life of an individual as well as socio historical circumstances. For example, divorce is one transition. Researchers have found that the negative effects of divorce on children often peak in the first year after the divorce. Two years after the divorce, family interaction is less chaotic and more stable. An example of socio historical circumstances, would be the increasing opportunities for women to pursue a career (Bronfenbrenner, 1979).

The ecological theory is one among the many different theories related to human development. It emphasizes environmental factors as playing the major role to development. However this theory varies from culture to culture. ATOD – (Alcohol, Tobacco and other Drugs) (see figure 4.5 below)

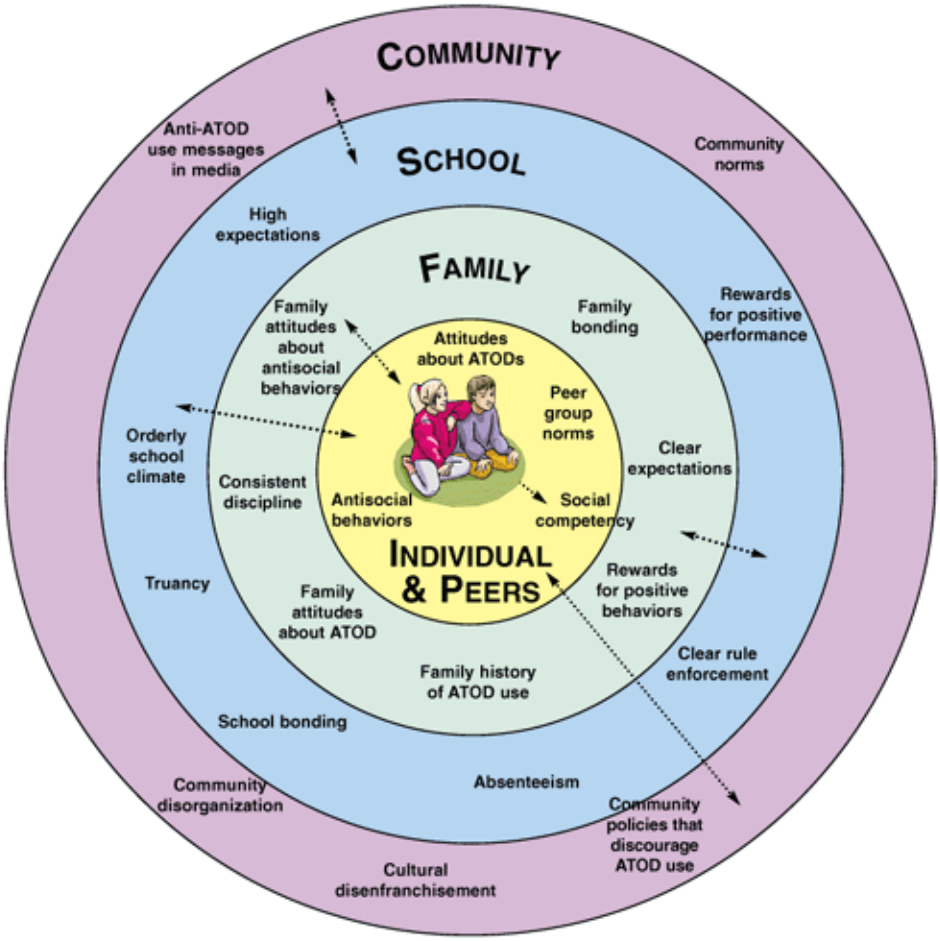


Figure 4.5: Model of Bronfenbrenner's Ecological Theory (1979)

(Bronfenbrenner, 1979)

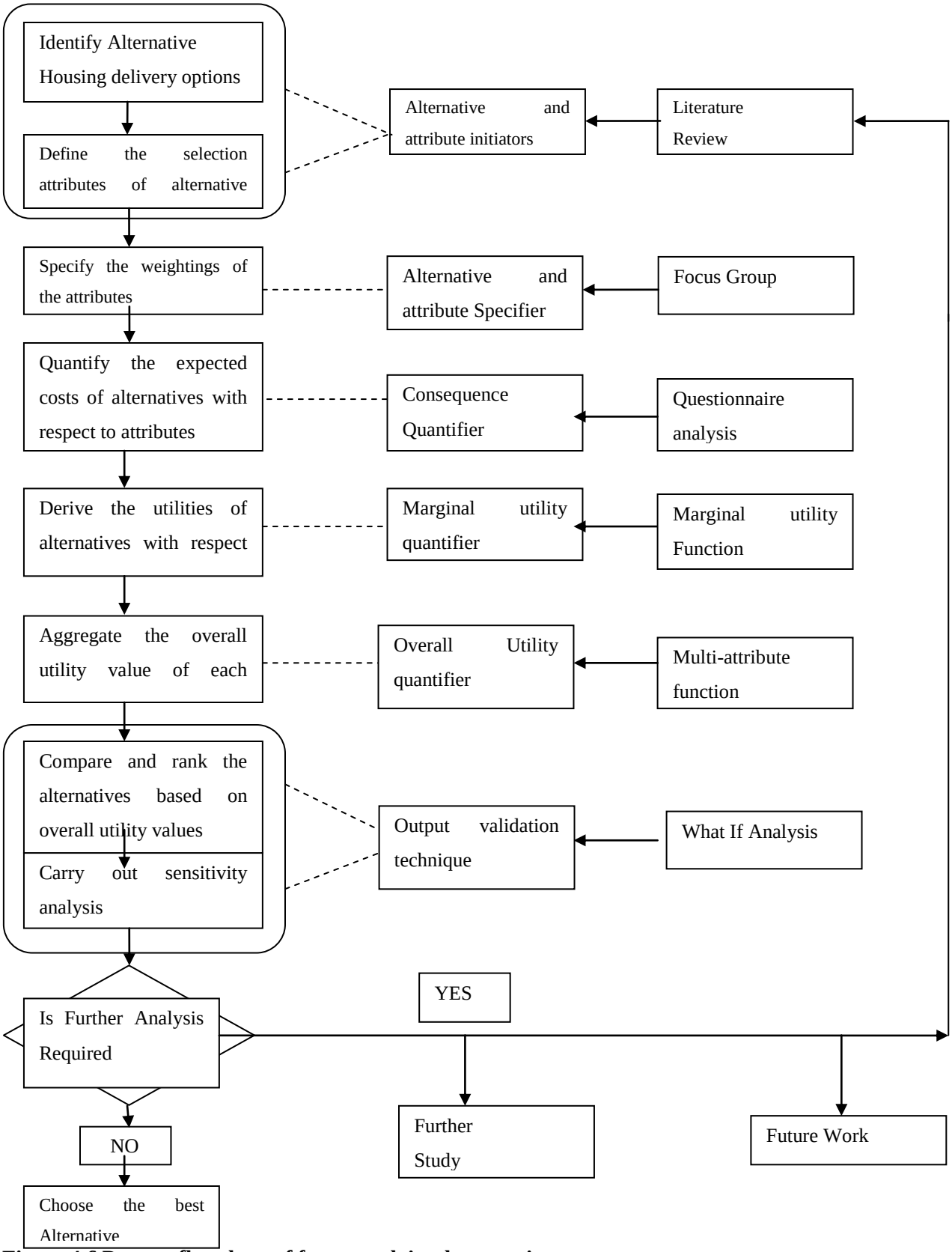


Figure 4.6 Process flowchart of framework implementation

Adapted (Lade, 2013)

Figure 4.6 above is designed to show the process of housing delivery using a range of options and going through various alternatives in selecting one that favours the individual, the developer or the government establishment. The attributes are shown and the weightings are attached to each characteristic to indicate the importance, the value attached and the essential aspects. An analysis is done of the attributes using a selection/weighting system that would ensure that other factors are taken into consideration and also allow a review of the different alternatives and assign each one an utility value that can then be compared and ranked. This provides a robust process for arriving at a framework for housing delivery.

4.05 Theory

Theory is the meeting place of ideology, politics and explanation. Framing defining the field, the parameters of phenomena is the business of theory (Pieterse, 2001) Theory is the critique, revision and summing-up of past knowledge in the form of general propositions: the fusion of diverse views and partial knowledge in general.

Also, all theory builds on the back of, or in reaction to, already-existing theories and concepts. Thus the researcher should not start from scratch. What the researcher should seek to do however, is to strip housing of all that is external to it, and from this position of phenomenological reduction to determine what housing is and does. If the research begins with this analysis of the experience of housing itself they will be able to build – perhaps very slowly – a corpus of concepts and theories that describe housing more fundamentally than any ‘‘outside’’ conceptions are likely to do. It may well be that this process of theory building limits the field of housing (Peter, 2009).

A theoretical framework consists of concepts, together with their definitions, and their existing theory/theories that are used for particular study. The theoretical framework must demonstrate an understanding of theories and concepts that are relevant to the topic of the research paper and that will relate it to the broader fields of knowledge in the specialist area (USC Libraries, 2013).

4.06 Other theories - Neoclassical theory and Prospect theory

Neoclassical theory postulates that preferences between two goods are independent of the consumer's current entitlements, while prospect theory is said to invoke psychological effects (List, 2004).

Theory is a distillation of reflections on practice into conceptual language so as to connect with past knowledge.

A careful look at practice can generate new theory and theory or theoretical praxis can inspire new practice (Pieterse, 2001).

4.07 Further Research Methods

Common sense and clear thinking necessary for the management of the entire research endeavour. _ Research design is the strategy, the plan, and the structure of conducting a research project (Carriger, 2000).

The aim of this research was to articulate a framework that can aid decisions and increase knowledge in the area of housing delivery for Lagos state.

Two ways used to gain knowledge in this framework development were:

Deductive logic - methodology that relies on logical reasoning and begins with a major premise.

Inductive logic - methodology that begins not with a major premise but with an observation.

4.08 The Scientific Method

A means whereby insight into the unknown is sought by:

• Identifying the problem that defines the goal of the research;

• Gathering the data with the hope of resolving the problem;

• Positing a hypothesis;

• Empirically testing the hypothesis by processing and interpreting the data.

The scientific method involves:

• The induction of hypotheses based on observations;

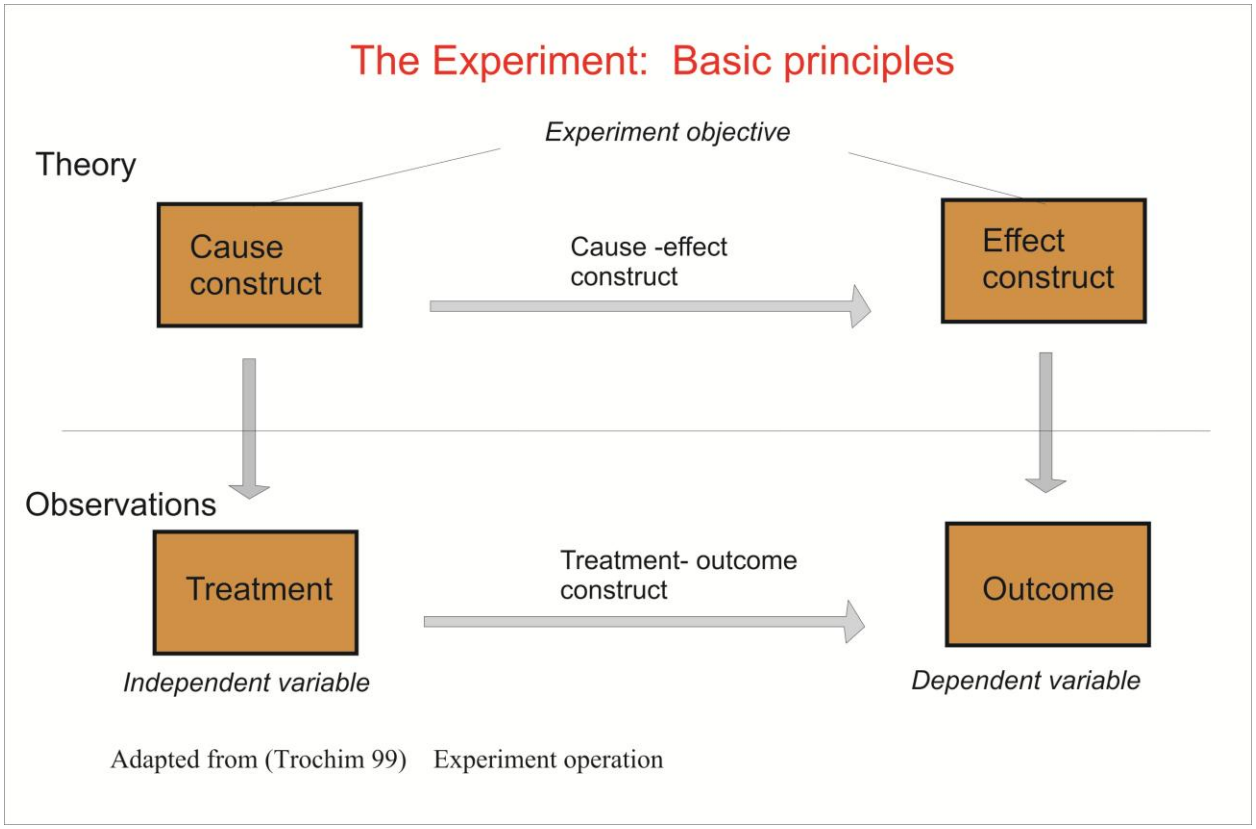


Figure 4.7: Research design

(Carriger, 2000)

Most previous research uses multivariable elements. These aspects are important in the provision of adequate and sufficient facilities in the neighbourhood quality for the resident's necessities and requirements (Rahman, et al., 2012).

The basis for the statistical analysis of an experiment is hypothesis testing.

4.09 Hypothesis–

A formally stated guess as to the outcome of the experiment, which data collected during the course of the experiment can be used to support or reject.

Conclusions can only be drawn if the hypothesis is rejected.

A case study approach: due to the predominant estates coming up in Lagos state

A combination of qualitative and quantitative research techniques.

- Secondary data collection
- Questionnaires

- Semi-structured interviews
- Focus group discussions (guided by checklist)
- Direct observations (guided by a checklist)
- Housing estates data

4.10 Why would you use it?

The objectives of monitoring/measuring impact of housing delivery framework include understanding the patterns and causes of housing delivery, quantifying the costs of housing delivery, increasing public awareness of the issues surrounding housing delivery framework and providing a basis for actions and reform. An effective housing framework depends on diagnosis and understanding of the infrastructure and housing delivery sector. There are few methodologies that either measure the extent of housing delivery in the infrastructure sector or seek inhabitant's perceptions of housing policy.

4.11 How to use it:

The process of creating a housing delivery framework, its development and implementation involved a number of steps:

First, secondary data was collected and analyzed (official reports, press articles and research documents) for information.

1. Second, the strategy for data collection focused on:
2. The kinds of infrastructure and housing the inhabitants used and wanted;
3. The locations where they lived (urban, peri-urban and rural areas that might be illegal and/or geographically isolated);And here housing was found in formal delivery systems:
4. Policy making, financing, development and implementation
5. Surveys were conducted on housing policy in general and its incidence in infrastructure and housing delivery in particular.
6. Interviews were held with a range of stakeholders, including construction professionals, private sector contractors, local leaders, elected government officials, academics and especially low-income residents.

It was also possible to interview those who had been directly or indirectly affected in cases involving infrastructure and housing delivery. The problems of lack of amenities, poor maintenance, strained relationships between public housing residents and management, chronic financial crisis have been mentioned as recurring themes of state controlled public housing (Davidson, 1999). Focus group discussions with a range of stakeholders including lender, government, local agencies and users were held; households and service providers were asked about their perceptions of housing delivery in

infrastructure and housing implementation services, existing problems and ways to overcome the problems. A transact-walk could also be conducted to collect supportive information through direct observation in the study location.

We proposed asking an inhabitant to write an account of their experience of housing delivery and public housing (on either the demand or supply side) in the form of a diary or in the style of a story.

After the data was collected and analyzed, the results were shared and interpreted by focus groups comprised of stakeholders and prospective inhabitants.

Finally, the researcher would present the main findings back to stakeholders in workshops to build consensus and find acceptable solutions to housing delivery problems. Findings will then be used to reveal the differing perceptions and disproportionate impacts of housing delivery in the infrastructure sector on the inhabitants.

4.12 When would you use it?

The methodology for investigating housing delivery can be applied to key points in the infrastructure project cycle (proposal preparation, release of funds and procurement, implementation) as well as service delivery. The research would be used for understanding the mechanisms of housing delivery and the strategies for tackling it.

4.13 Who uses it?

The methodology can be instituted: by public or private developers, government regulators or the utility itself (to benchmark service quality, diagnose gaps or identify corrective action);by community-based organizations to collect experience from users and advocate for solutions to widely encountered problems; by stakeholder consortiums of government officials; community representatives, academics, the media and so forth (multi-stakeholder partnerships can use the approach to come to an agreement on an issue, identify priority action and check improvements); or by development agencies to benchmark service quality and monitor improvements from development projects and policy interventions. The costs will vary depending on the sample, questionnaire and the survey method.

4.14 How has the methodology been used in the housing delivery sector?

Findings from surveys that apply to the housing delivery sector are useful for general policy advice. However, to date, there has been a lack of data on housing delivery and infrastructure provision.

The methodology for investigating housing policy covers many aspects of service delivery and identifies the multiple reasons for corrupt, inefficient and ineffective service delivery. By obtaining more accurate

information on when, why and how much the inhabitants pay for housing and service delivery, including information about the cost, timeliness, coverage and quality of each service. Service providers (the state and private sector) are better equipped to make decisions on how to improve housing delivery. This information is key to developing a framework for housing delivery.

4.15 What use is it to the inhabitants?

A pro-inhabitants focus in researching a framework for housing delivery is aimed to assess both how the inhabitants are affected by housing policy in the infrastructure sector and how greater accountability in service delivery improves the assets and capabilities of the inhabitants. The findings of the research should enable the voices of the inhabitants to be heard in policy discussions, as well as to ensure that publicly or privately provided services are specifically targeted to the needs of the inhabitants.

4.16 Summary

In trying to achieve the aim of this research which was to articulate a framework that can aid decisions and increase knowledge in the area of housing delivery for Lagos State, deductive and inductive logic methodologies were utilised. The research philosophy was initially chosen and affirmed based on the researchers background and some Heuristic inquiry helped with a desire to resolve this ubiquitous problem observable through the lenses of life growing up in the community. Personal experience and insights of the researcher played a role. Intuitive inquiry enabled the researcher to listen to his own voice in self observation methods. The existing theories were reviewed and Bronfenbrenner theory on ecology relating to human development emphasizes environmental factors as playing the major role to development. The scientific method was one of the methods utilised which is a means whereby insight into the unknown is sought by identifying the problem that defines the goal of the research. Other methods involved the extensive literature review, Interviews with government officials, developers and government parastatals. A qualitative analysis of archival materials, publications and other data was important. A quantitative and qualitative strategy was adapted. Questionnaires were used in areas of case studies. The research objectives were attained by the above methods and information adopted in the literature review as shown in this chapter and data collection and analysis process highlighted in the following chapters.

CHAPTER 5- PILOT AND CASE STUDIES

5.00 Introduction

A pilot, or feasibility study, is a small experiment designed to test logistics and gather information prior to a larger study, in order to improve the latter's quality and efficiency. A pilot study can reveal deficiencies in the design of a proposed experiment or procedure and these can then be addressed before time and resources are expended on large scale studies. The term 'pilot studies' refers to mini versions of a full-scale study (also called 'feasibility' studies), as well as the specific pre-testing of a particular research instrument such as a questionnaire or interview schedule. Pilot studies are a crucial element of a good study design. Conducting a pilot study does not guarantee success in the main study, but it does increase the likelihood. Pilot studies fulfill a range of important functions and can provide valuable insights for other researchers. There is a need for more discussion amongst researchers of both the process and outcomes of pilot studies (Teijlingen & Hundley, 2001).

A pilot study has been carried out which included pilot interviews with key government officials to get their views on the state of the ministry in terms of their vision, goals and objectives for delivering the required housing for the state. It was apparent based on their answers to the questions raised that the tasks were arduous and they had no clear strategy or policy to deliver. (the pilot study questions are in Appendix B)

As (Cannell & Kahn, 1989) indicate, when the researcher has limited experience with a topic or an interviewee has difficulty with a question, substantial work may be necessary to develop questions that will obtain the desired results. The pilot testing process gave the researcher feedback as to whether the questions will elicit the required responses and address the following key issues:

Are the right questions being asked to obtain the needed information?

Are the contents/wording of each question relevant to intended interviewees?

Do interviewees have the knowledge to answer the questions? (Taylor, et al., 2009)

5.01 Housing Indicators

As a component of the household's statistics, housing conditions play varied roles in the life of the people.

This chapter provides indicators in measuring the standard of dwelling houses and availability of certain infrastructural facilities in the dwellings. In some ways, they measure the standard of living of the people of Nigeria. These are indicators generated from National Bureau of Statistics regular surveys.

The table 5.1 below shows the percentage distribution of households by State and type of tenure, 2005-2008. In 2005, there were over 28million households in Nigeria. The number increased by 8.98 per cent to over 30 million in 2006. Normal rent accounted for 25.9 per cent of the tenures in 2005, increasing to 41.2 percent in and dropped to 14.4 per cent in 2008. On the other hand, owner-occupiers recorded a steady increase over the years from 30.9 percent in 2005 to 71.7 percent in 2008. On a state basis, Kebbi state recorded the highest percentage of owner occupation with 97.7, while Lagos had the lowest, at 26.2 percent.

The table presented the percentage distribution of households by type of housing unit for 2007 and 2008. Single room housing unit recorded the highest in both years with 68.6 per cent in 2007 and 66.3per cent in 2008, while Duplex housing unit had the least 0.4 per cent in 2007 and 0.3 per cent in 2008.On State level single room housing unit had high percentage in Katsina and Bauchi with 98.7 and 98.1 respectively in 2007, while Bauchi took the lead in 2008. Zamfara recorded the lowest percentage of 4.6 in 2007 and 20.2 per cent in 2008.

Achieving the targets on reducing CO_2 emissions can be more effectively pursued using technological improvements such as switching to non-fossil energy sources. This can also be achieved by substantial behavioural changes such as shifting from the automobile to public transport. The latter demands strong incentives or penalties to make a significant difference, which would have a detrimental effect on some of the social and economic indicators (Echenique, et al., 2012).

Table 5.1 – Percentage distribution of households by type of Housing Unit 2008

NBC/CBN/NCC Social Economic Survey on Nigeria, 2008 (National bureau of statistics, 2012)

STATE	**Single Room**	**Flat**	**Duplex**	**Whole Building**	**Other Types**
Abia	38.1	3.7	0.7	57.0	0.5
Adamawa	83.3	2.1	0.0	14.5	0.0
Akwa Ibom	51.8	8.1	0.3	39.6	0.2
Anambra	30.4	3.7	0.2	64.5	1.2
Bauchi	98.6	1.1	0.4	0.0	0.0
Bayelsa	69.8	14.5	0.8	14.1	0.8
Benue	70.6	6.2	0.2	23.0	0.0

Borno	92.8	0.6	0.2	4.0	2.6
C/River	66.4	6.1	0.3	26.6	1.5
Delta	70.4	8.7	0.2	20.2	0.6
Ebonyi	24.8	1.2	0.0	73.5	0.5
Edo	68.4	7.3	0.0	24.2	0.2
Ekiti	74.8	8.5	0.2	16.5	0.0
Enugu	26.2	6.0	1.7	65.9	0.2
Gombe	71.4	2.4	0.0	26.2	0.0
Imo	14.5	2.5	0.8	81.8	0.3
Jigawa	30.1	9.3	0.2	59.0	1.4
Kaduna	89.5	9.2	0.0	1.3	0.0
Kano	74.6	2.4	0.7	22.2	0.2
Katsina	94.7	1.7	1.0	2.4	0.2
Kebbi	97.5	0.7	0.0	1.8	0.0
Kogi	58.1	4.6	0.0	36.9	0.3
Kwara	70.3	5.6	0.0	24.1	0.0
Lagos	69.8	26.4	2.1	1.4	0.3
Nasarawa	62.5	5.5	0.0	31.9	0.2
Niger	72.4	5.4	0.0	22.1	0.0
Ogun	86.8	8.0	0.0	4.3	0.8
Ondo	81.3	3.1	0.0	15.4	0.2
Osun	81.9	7.1	0.0	11.0	0.0
Oyo	82.4	9.9	0.5	8.2	0.0
Plateau	79.1	1.9	0.0	19.0	0.0
Rivers	54.5	5.7	0.8	38.4	0.5
Sokoto	70.0	2.4	0.0	27.1	0.5
Taraba	91.7	1.8	0.0	6.1	0.4
Yobe	92.2	0.4	0.0	6.0	1.4
Zamfara	20.2	5.8	0.8	72.9	0.3
FCT	48.4	17.8	0.2	33.6	0.0
NIGERIA	66.3	5.8	0.3	27.2	0.4

5.02 Case Study

A case study housing development was also used for this research as it was considered ideal to meet the research objectives. Five housing estates were identified namely:

1. Jubilee Housing Estate, Ayangburen, Shagamu Road, Ikorodu
2. Low cost Housing Estate, Ire-Akari, Isolo, Lagos.
3. Jakande low cost housing estate, Ikorodu (blocks of 6 flats each painted green)
4. Jakande Estate, Oke Afa-Isolo Lagos.
5. Federal Housing Estate, Ikorodu (Shagari Estate)

Jubilee Housing Estate, Ayangburen, Shagamu Road, Ikorodu

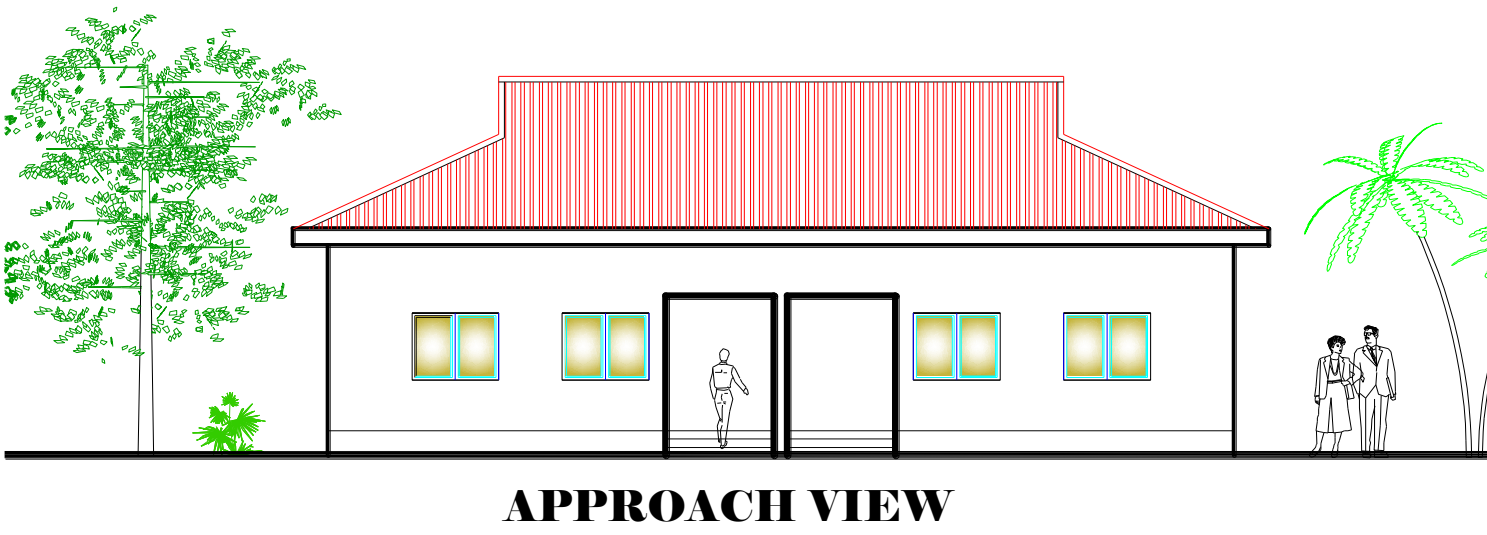


Figure 5.1: Approach View for Housing unit at Jubilee housing estate Ayangburen Ikorodu

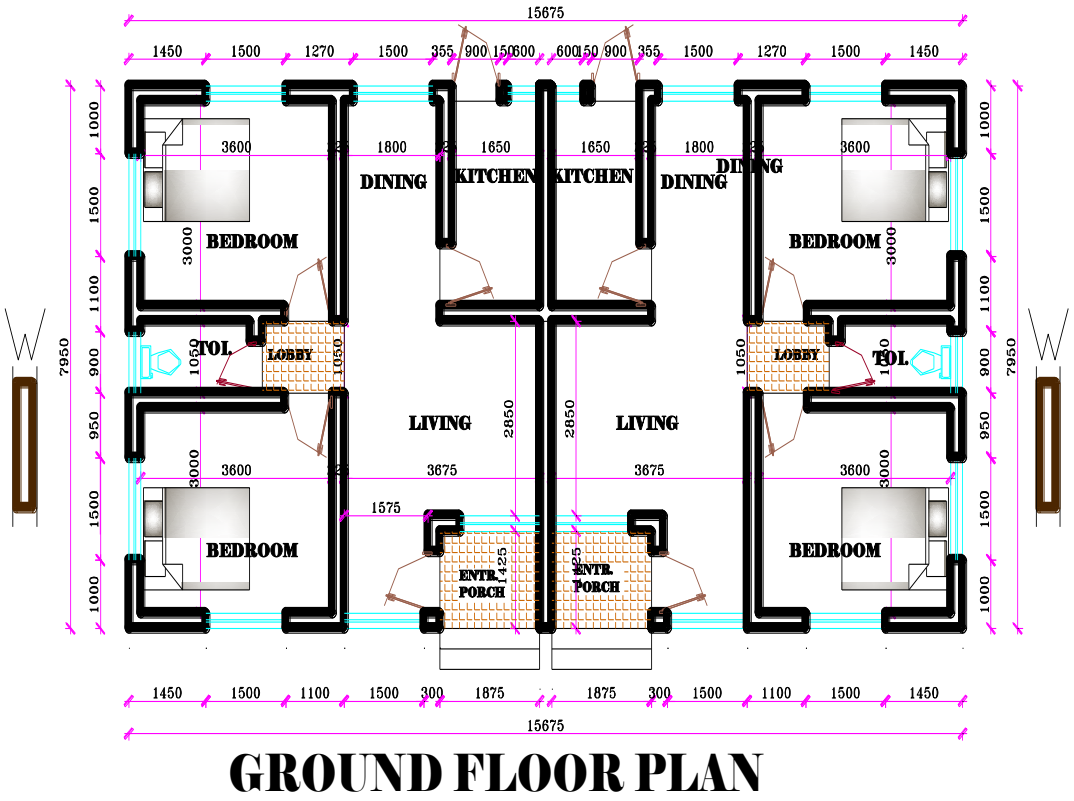
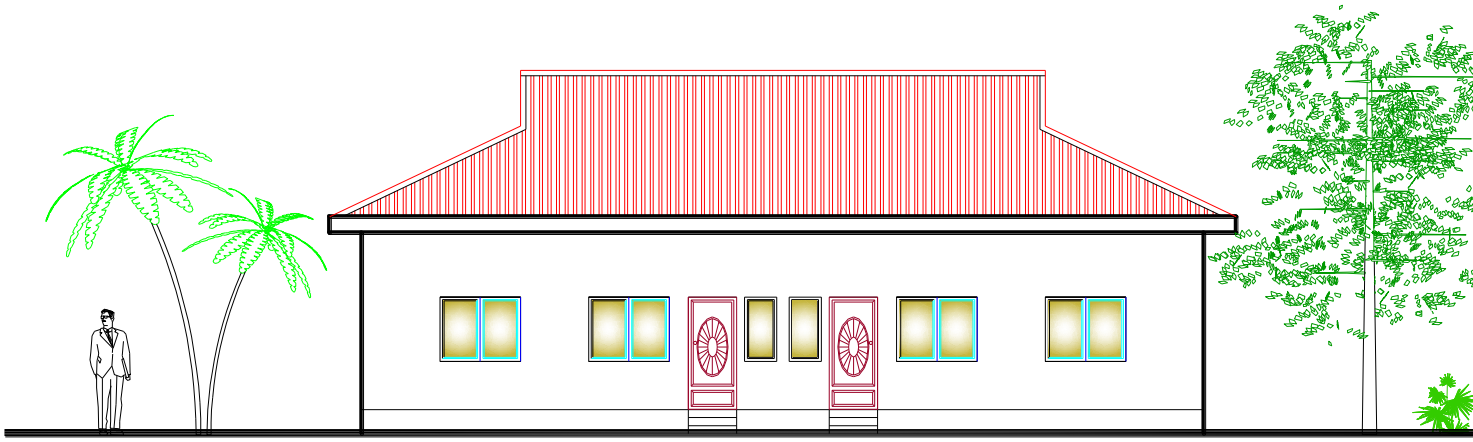


Figure 5.2: Ground Floor Plan for Housing unit at Jubilee housing estate Ayangburen Ikorodu



REAR VIEW

Figure 5.3: Rear View for Housing unit at Jubilee housing estate Ayangburen Ikorodu

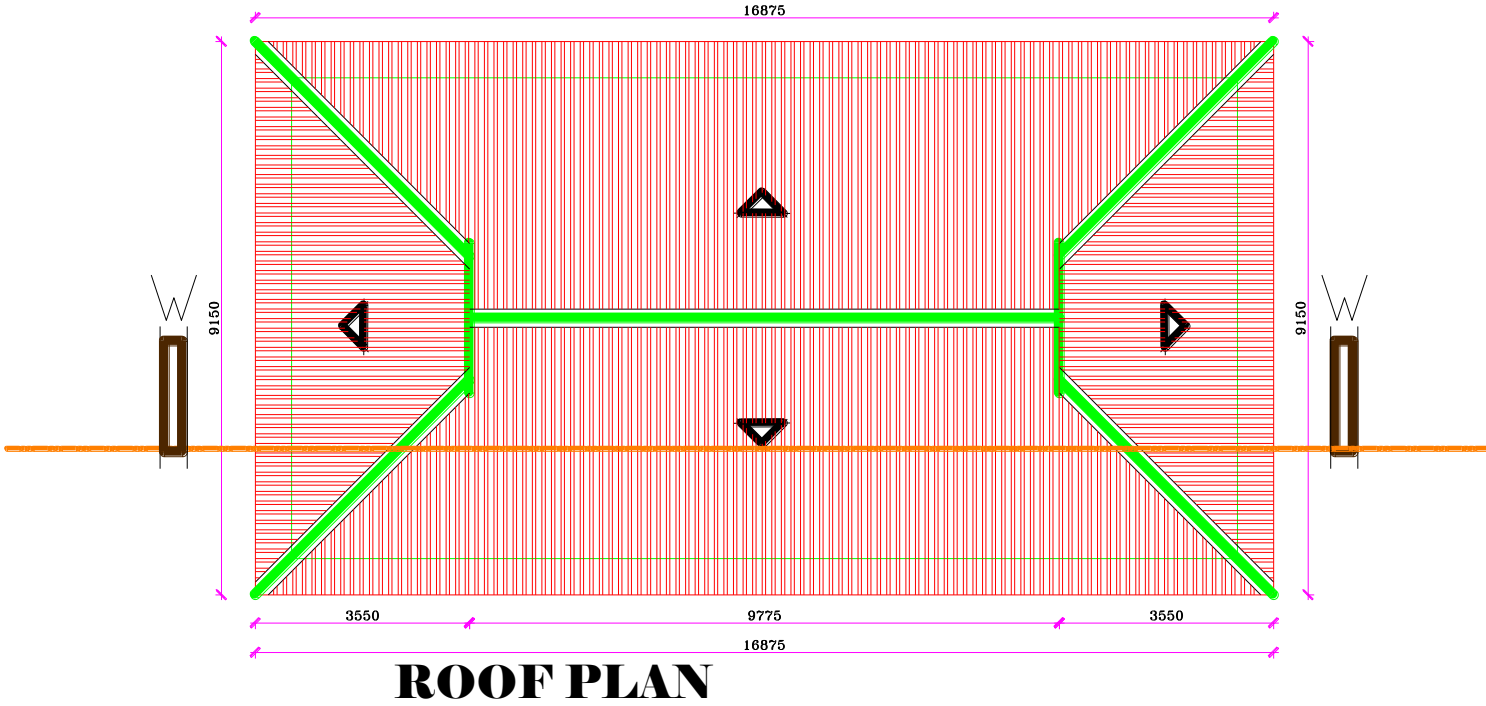


Figure 5.4: Roof Plan for Housing unit at Jubilee housing estate Ayangburen Ikorodu

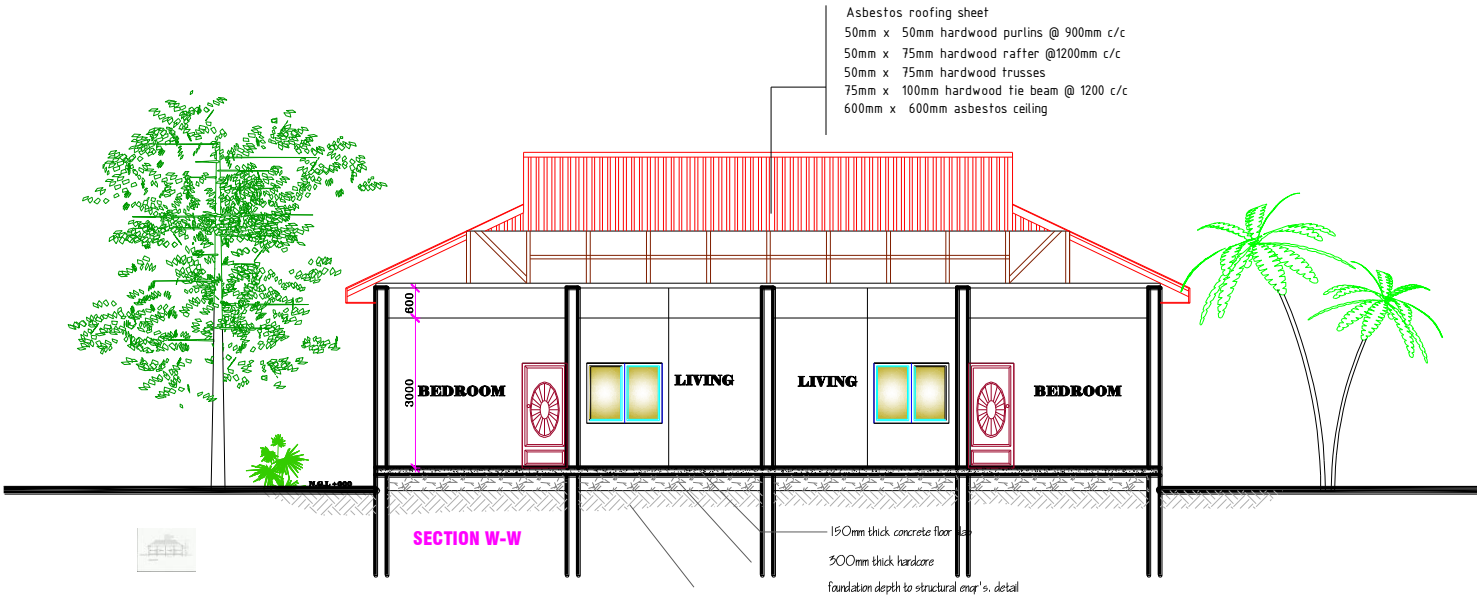


Figure 5.5: Sectional view for Housing unit at Jubilee housing estate Ayangburen Ikorodu

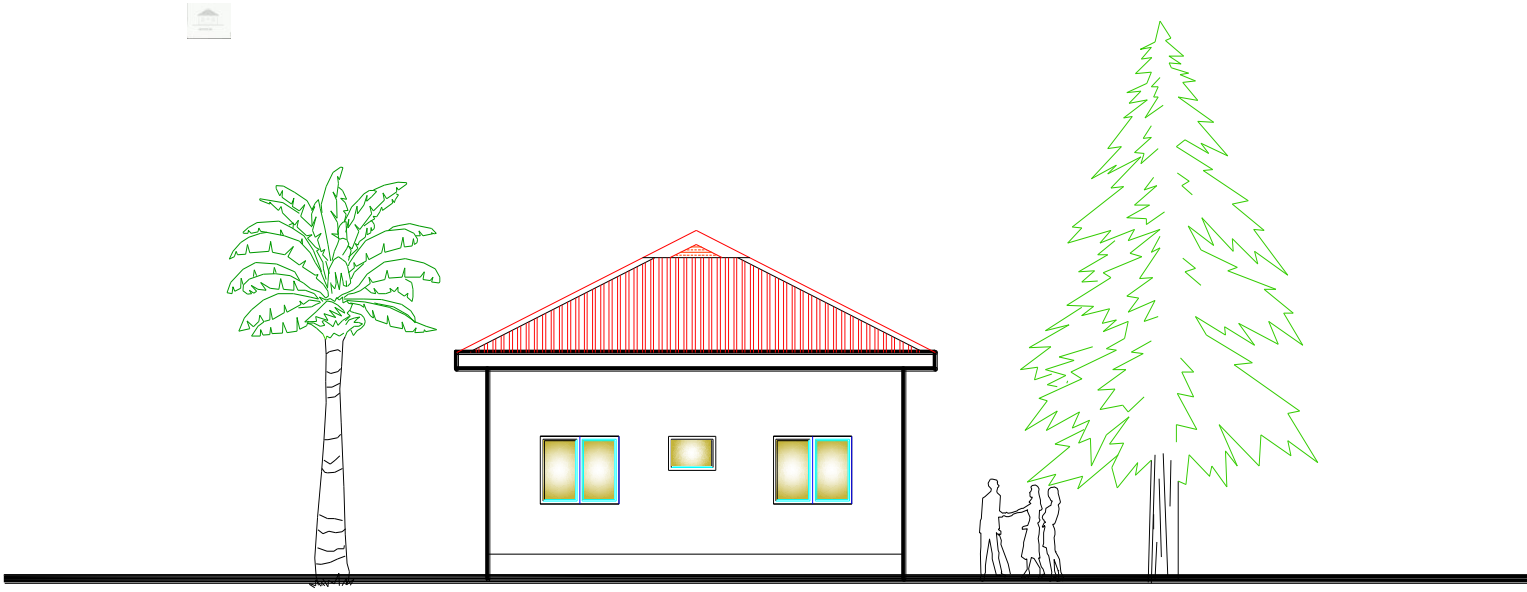


Figure 5.6: Typical Side view for Housing unit at Jubilee housing estate Ayangburen Ikorodu

A case study is a type of field study defined as an empirical enquiry that investigates a contemporary phenomenon within its real life context (Yin, 2004, p.14) Case studies commonly see the researcher adopting several methods to collect data, including observations, interviews and documentary analysis (Robson, 2002)(Yin, 2002) described six sources of evidence that can be collected for case study research: documents, archival records, interviews, direct observation, participant observation and physical artefacts. Yin states that these are highly complementary (Ibid p.80) and that a good case study will want to use as many as possible (Ibid p.80) to enable triangulation of findings. The present research aims to use documents, interviews and participant observation.

5.03 Interviews

Interviews provide a way of generating data by asking people to talk about their everyday lives (Miller & Brewer, 2003) There are various types of interviews: structured, semi structured and unstructured. Theses provide varying extents of depth and flexibility of responses (Robson, 2002) Unstructured informal interviews are commonly used in qualitative research, but more structured interviews are suited to case studies where time is limited or where it is desirable to obtain some specific or focused information. (Schwandt, 2001) Interviews with various stakeholders were completed over the course of the research period. Interviews are however time consuming and questions posed can be seen as intrusive by the interviewee. There is also a risk that data may not reflect participants true thoughts and feelings and it is very difficult to know when this is the case, although triangulations with other data sources can help (Beadle, 2008).

5.04 The Interview Design

The interviews were designed using standard best practice guidelines suggested by (Bryman, 2008). The semi-structured interview is in sections (see Appendix D):

There were 38 questions eventually sent out to interviewees. The questions were formed as a result of the literature review which highlighted pertinent issues and questions that needed answers.

The interview took an average of about 28 minutes per person to answer the 38 questions. It was recorded by note taking. (see Appendix E) The data was transcribed by writing down what was spoken. Transcribing is an interpretive act rather than simply a technical procedure and the close observation that transcribing entails can lead to noticing unanticipated phenomena (Bailey, 2008).

Table 5.2 List of Interviewees

	RESPONDENT	**POSITION**	**JOB**
1	RESPONDENT A	Managing Director	LSDPC
2	RESPONDENT B	Professor	Dept. of Architecture, University of Lagos
3	RESPONDENT C	Professor	Dept. of Architecture, University of Lagos
4	RESPONDENT D	Commissioner	Ministry of Housing Lagos State
5	RESPONDENT E	Director of Architecture	Ministry of Housing Lagos State
6	RESPONDENT F	Director of Housing	Ministry of Housing Lagos State
7	RESPONDENT G	Director of Estates	Ministry of Housing Lagos State
8	RESPONDENT H	Managing Director	Property and Investment Company
9	RESPONDENT I	Managing Director	Architects and Urban Designers
10	RESPONDENT J	Chief Operating Officer	Architects and Urban Designers

5.05 The Questionnaire Interviewees profile

The profile of the main questionnaire interviewee was identified from the pilot study completed by the researcher much prior to drawing up the final questionnaire. A pilot run is always essential (Taylor, et al., 2009).

The researcher spent quality time in the neighbourhoods and assessed the conditions and the different people resident in the housing estates in Lagos state generally. The statistics of the various groups of people was drawn up following the desk study gathered from the literature review.

The groups initially identified were within the age ranges of Young adult (18-30); Adults (31-45); Middle Aged (46-60) and Elderly (61 and above)

Also their occupation was divided into either student (tertiary institution): Unemployed; Employed; and Retired. It was assessed that based on the local demographics it would be ideal to curtail the groups as identified above (Uji, 2009).

5.06 Relevance of questionnaire interviewee to sustainable development of housing

The essence of this research was to hear from the occupiers affected by the housing shortages and what their issues are. (Uji, 2009)Living in the area they are able to analyse the benefits and disadvantages over the years. They are there first hand to give a live report of the advantages and disadvantages of being a resident. The flaws to the design, the living spaces, the building in terms of materials, drainage, plumbing, safe water, sanitation and healthy environment they are able to identify it.

The interviewee has suffered the lack of proper power, roads, transport, sanitation and non-provision of parks etc. The interviewee lives and breathes the housing development and is therefore best placed to inform the researcher.(Bordignon, 1998),(Salama, 2006) and (Sidawi, 2008) presented that poor housing conditions directly signify poor social conditions. Therefore, a properly designed sustainable housing project can provide homeowners with the positive social conditions necessary to promote strong community development. A socially acceptable house will directly address the cultural needs of the people in terms of size, affordability and function as well as address the intangible benefits of housing such as security, safety, aesthetics, sense of accomplishment and the community. (Friedman, 2005).The social grade of the interviewee is also relevant here as its useful to note that the housing estates is mainly inhabited by a certain group (Collis, 2009).

5.07 Summary

As noted above a pilot study is designed to gather information prior to a larger study, in other to improve the latter's quality and efficiency. Housing indicators show the breakdown of household distribution by type of housing units.

The selection of the case study estates was important to the relevance of the research. A list of possible methods was reviewed and case study was one of the options selected for the research. There were many

considerations prior to selecting the case study but it was clear that the case study method would get the level of description in conjunction with the other methods. Time in the field, interviews, transcription and analysis were factors all thought about prior to engaging in the case study exercise.

The estates were selected to show a cross section of government developments across the state and its impact and usefulness to the populace from the occupier's viewpoint. It's pertinent to note that the professionals interviewed spoke about the projects they are involved in while the occupiers spoke candidly about the key issues affecting their homes. The study is completed with the help of questionnaires, case studies and existing information. Extrapolation/inference factors and predictive values derived from academic and policy literature. As information is not always readily available from either the ministries or the institutions there is a need to make deductions and conclusions based on literature, interviews with people, case studies and observations. The case study will provide a good realistic response in addition to a purely statistical survey. The case study gave the opportunity to focus on specific housing developments. These interviews have enabled the drawing up of the questionnaires and the case study housing developments formed the area for distributing the questionnaires and the collation of data for further analysis as shown in the next chapter.

The interviews were designed using standard best practice guidelines. One of the objectives of this research was to hear from the occupiers affected by the sustainable housing shortages and what their issues are. The researcher spent quality time in the neighbourhoods and assessed the conditions and the different people resident in the housing estates in Lagos state generally. The statistics of the various groups of people was drawn up following the desk study gathered from the literature review. In order to fully develop the conceptual framework, an exploratory pilot study was undertaken through semi structured interviews conducted with housing ministry officials and developers from contracting organisations and analysis of questionnaire results.

One of the key objectives was met in this chapter and the above has summarised the housing indicators, pilot and case studies used. The data collected from this case study locations formed the core of the research and are used and referred back to throughout the present thesis.

CHAPTER 6–DATA COLLECTION AND ANALYSIS

6.00 Introduction

This survey was conducted on design and technology impact in general and its incidence in infrastructure and sustainable housing delivery in particular. Interviews were also held with a wide range of stakeholders.

The results from the questionnaire and findings of the research should enable the voices of the inhabitants to be heard in policy discussions, as well as to ensure that publicly-provided services are specifically targeted to the needs of the inhabitants.

Data Analysis is the process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data. According to (Shamoo & Resnik, 2003) various analytic procedures "provide a way of drawing inductive inferences from data and distinguishing the signal (the phenomenon of interest) from the noise (statistical fluctuations) present in the data"..

6.01 Questionnaire justification and findings delivery

Information sought through questionnaire survey include:

1. Inhabitants impression of design and technology
2. Inhabitants impression of state government performance
3. Inhabitants impression of environmental issues and infrastructure
4. Inhabitants impression of existing property

Surveys can empower the inhabitants to act as active agents able to understand, anticipate and explore their needs and interests, participate in municipal agenda-setting and help administrations solve the city's infrastructure problems; this will help address the lack of knowledge and power that makes the inhabitants so vulnerable to the inept and corrupt practices of others. This is a far cry from the stereotypical image of the inhabitants as anonymous and passive 'consumers of development'.

Through such surveys, the inhabitants would reveal their awareness of and access to the infrastructure services. They will grade service quality and adequacy, including the treatment they receive from providers, voice their satisfaction or dissatisfaction with the services. They will also rate costs as affordable or beyond their means and share their experiences in dealing with public officials. These are all vital inputs for policy formulation. The welfare and opinions of the inhabitants must be monitored regularly, to assess whether public agencies are becoming more (or less) responsive to their clients.

The researcher studied various frameworks and sustainability assessment methods to enable a proper drafting of the questionnaire that was eventually used. Many assessment techniques, such as the Building Research Establishment Environmental assessment Method (BREEAM) in the UK and the leadership in Energy and Environmental Design (LEED) programme in the USA, increasingly recognise the complexity of choices or decisions required - and both techniques are discussed in more detail. A self-assessment sustainability tool kit was adopted for architecture students (Edwards, 2010).

6.02 Sample strategy, size and response rate

The sampling strategy selected was as a result of our research methods and design as well as taking into account research ethics. There are different types of sampling strategies such as random sampling, probability sampling, non-probability sampling and purposive sampling which is a type of non-probability sampling. The purposive sampling method was adopted for this study as it's usually used when a researcher chooses specific people within the population to use for a particular study or research project. One of the major benefits of purposive sampling is the wide range of sampling techniques that can be used across such qualitative research designs; purposive sampling techniques that range from homogeneous sampling through to critical case sampling, expert sampling, and more. Purposive sampling can involve developing a framework of the variables that might influence an individual's contribution and will be based on the researcher's practical knowledge of the research area, the available literature and evidence from the study itself. (Marshall, 1996) The sample size is 500 and this number was chosen because the population can have a significant impact on the quality of the results either being too small or excessively large both potentially leading to incorrect findings. As a result sample size calculations are sometimes performed to determine how large the sample size needs to be to avoid problems. (Laerd Dissertation, 2012) The response rate was 96.3%.

6.03 Questionnaire Design

General Principles

To find out what is in respondents' minds its best to ask them questions they can truthfully answer about their environment, their consciousness, their knowledge and their behaviour.
The researcher allowed the respondents say what he or she means and did not impose values, perceptions or language on the respondent. A questionnaire consists of four integrated layers: objectives, questions, words and layout, and the sum of these is greater than the whole.

DESCRIPTIVE ANALYSIS

This deals with the study of the distribution of the variables of study (in relation to subjects) such as the profiles of respondents, organizations, groups or any other subject. Descriptive statistics is concerned with the techniques that are used to describe or characterize data (Chow & Liu, 2008). Some of these techniques include frequency distribution, measures of central tendency and measures of dispersion. A frequency distribution presents the score values and their frequency of occurrence. When presented in a table, the score values are listed in rank order, with the lowest score value usually at the bottom of the table (Pagano, 2009) (Kerr, et al., 2002).

Measures of Central tendency: These are also known as measures of location and they include the mean, median and mode (Lee, et al., 2013) (Buglear & Fisher, 2004). The mean is the sum of the set of scores divided by the number of scores in the set (Blaikie, 2003). It is the most frequently used of all the measures of central tendency. The median is a statistic used to describe the mid-point of a distribution while the mode measures the nature of the distribution by showing the value which occurs most frequently within the distribution. Nevertheless, the median is more ideal because it takes into account the fact that respondents' views can be ranked on ordinal variables (De Vaus, 2002). The median and the mode are the only measures of central tendency that can be used for ordinal data, in which values are ranked relative to each other but are not measured absolutely. According to (Gravetter & Forzano, 2012) when scores are measured on an ordinal scale, the median is always appropriate and is usually the preferred measure of central tendency.

Measures of Dispersion: These are measures that describe the dispersion or spread of a set of observations (Lee, et al., 2013). There are various methods of measuring dispersion which include Range, Standard deviation, Quartile deviation and Mean deviation (Jain & Sandhu, 2007). However, the

most commonly used summary statistic for determining the dispersion of a distribution is the standard deviation. (Kohler & Kreuter, 2005) described standard deviation as the "average distance" of the observations from the arithmetic mean.

INFERENTIAL STATISTICS

Statistical inference is the process of drawing conclusions from data that is subject to random variation. The aim of the researcher using inferential statistics is to use sample scores to make statement about the characteristics of the population. It is divided into two parts; parametric and non-parametric statistics. Parametric statistics is a branch of statistics that assumes that the data has come from a type of probability distribution and makes inferences about the parameters of the distribution. It includes tests such as Student test, Analysis of Variance (ANOVA), Regression analysis. In contrast, non-parametric statistics are distribution-free statistics. Non-parametric methods are widely used for studying populations that take a ranked order. These statistics include Spearman rho, Chi-square test. Generally speaking, parametric methods make more assumptions than non-parametric methods. In terms of levels of measurement, parametric methods result in scale or interval data while non-parametric methods result in ordinal data (Jamieson, 2004). The tests used in this study include one sample chi-square test, spearman rho, anova and student T-test.

CHI-SQUARE TEST

There are two types of chi-square test namely; (i) Chi-square test of independence and homogeneity (ii) Chi-square of goodness of fit test. The general procedure for testing the above involves comparing observed frequencies with some expected frequencies. Chi-square test of independence and homogeneity is used if the distributions of two variables in a population are independent. On the other hand, Chi-square goodness of fit is used with one variable having certain number of levels or categories. It checks if the population of interest (observed data) is distributed according to the theoretical distribution (expected data). In other words, chi-square test of goodness of fit can help to check if a distribution (responses) of frequencies for a variable in a sample is representative of specified population distribution. The process for the test is initiated when all the expected cell frequencies have been completed, then the difference between the observed cell frequencies and the expected frequencies is tested to confirm if it was due to chance.

In using this statistical technique, it is important to state the null hypothesis that there is equal distribution across the response categories in the population. The null hypothesis is rejected when the p value is less than 0.05 which implies the result is statistically significant.

SPEARMAN'S RHO CORRELATION

Spearman's rho correlation is a non-parametric statistics that is used when any one of the two variables to be correlated is expressed in ordinal scaling form. The test examines the degree to which cases (responses) with high ranking on one variable were observed to have similar rankings on another variable. Spearman's rho correlation test is a statistical test employed to evaluate the level of correlation between variables using ordinal data (Descombe, 2010). In this study, spearman rank correlation was used to test association between responses to questions to detect similar rankings. The test statistics of spearman rank order correlation, is given as follows:

$$r_s = 1 - \frac{6\sum d_i^2}{n(n^2 - 1)}$$

Where:

r_s is the Spearman's rank correlation coefficient

d_i is the difference between a pair of rank

n is the number of pairs of ranks.

The correlation coefficient is a measure of relationship between a pair of variable and it varies between +1 and -1. Where +1 means a perfect direct relationship between the pair while -1 means a perfect inverse relationship between the pair.

ANALYSIS OF VARIANCE (ANOVA)

Analysis of variance test is a parametric test used to compare the means of three or more groups. The ANOVA tests the null hypothesis that samples in three or more groups are drawn from populations with the same mean values. In this technique, subjects are randomly sampled from the population and then randomly assigned to the conditions, preferably such that there are an equal number of subjects in each condition. It determines whether there are significant differences between the means of three or more independent groups. The one-way ANOVA model analyses situations where chance variations are normally distributed $N(0,\sigma)$ so that:

$$X_{ij} = \mu_i + e_{ij}$$

For $i = 1,\ldots,I$ and $j = 1,\ldots,n_i$. The e_{ij} are assumed to be from an $N(0,\sigma)$ distribution. The parameters of the model are the population means $\mu_1, \mu_2,\ldots,\mu_I$ and the common standard deviation σ.

6.04 Data Analysis

Data were entered into a Statistical Analysis System and analysed using SPSS (Statistical Package for Social Science) version 20. Descriptive statistics and inferential statistics were utilized to adequately analyse the data. The descriptive statistical analysis carried out include frequency distribution and measures of central tendency like median and mode while the inferential statistics include chi-square test, spearman correlation test, one sample ANOVA test and Two Sample Independent T-test.

GENERAL CHARACTERISTICS OF THE RESPONDENTS

500 respondents participated in the survey. 4 data sets were deleted from the dataset because the respondents had not completed the survey or the questionnaires were not returned. Some of the questionnaires filled by the respondents have missing data which means that some questions were not answered or were not answered correctly. The remaining 496 datasets were analysed. The data collected were on socio-demographic factors (gender, age, occupation), sustainability indicators, property details and respondents' satisfaction with the Lagos state government performance in housing development. These general characteristics of our survey participants will be presented. Figure 6.1 shows the gender distribution of the data:

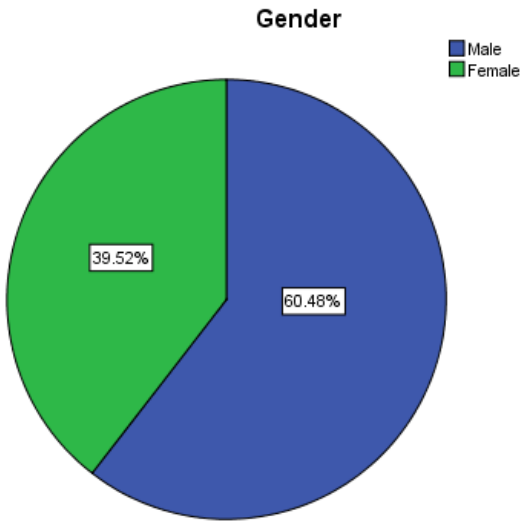


Figure. 6.1: Gender of the Respondents

There were 60.48% male and 39.52% female respondents. This reflects very well the overall gender distribution of residents in the low cost estates in Nigeria. The modal class of the respondents is 31-45 years. Upon further investigation of the age profile, over 75% of the respondents are 45 or younger. The next figure demonstrates the age of survey participants:

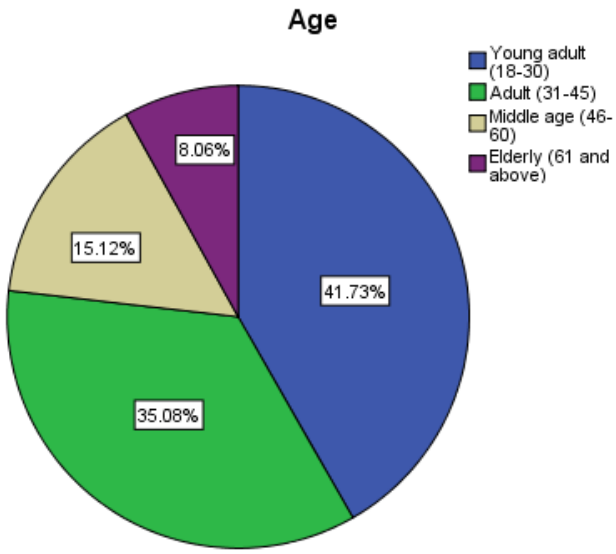


Figure. 6.2 Age profile of the Respondents

Figure 6.3 provides the share of different employment status in the sample at the different housing estates.

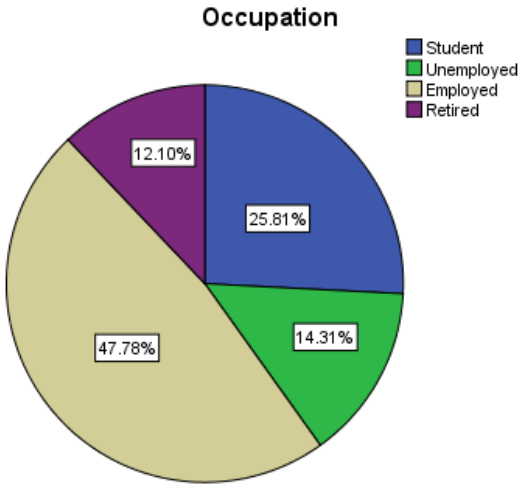


Figure. 6.3 Occupation Status of the Respondents

According to the chart above, there were 47.78% employed respondents, 25.81% students, 14.31% unemployed respondents and 12.1% retired respondents who participated in the survey. The next table 6.1 presents the cross-tabulation of the type of residence and home ownership status of the respondents.

Table 6.1 Cross-tabulation of the House ownership status and type of residence of the Respondents

Ownership * Residence Cross tabulation

			Residence			Total
			Bungalow	Flats	Duplex	
Ownership	Home Owner	Count	77	152	8	237
		% within Ownership	32.5%	64.1%	3.4%	100.0%
	Renting	Count	54	146	3	203
		% within Ownership	26.6%	71.9%	1.5%	100.0%
	Living with Others	Count	9	38	2	49
		% within Ownership	18.4%	77.6%	4.1%	100.0%
Total		Count	140	336	13	489
		% within Ownership	28.6%	68.7%	2.7%	100.0%

This simple cross-tabulation indicates that there are more home owners (with a total of 237 respondents) than people living by rent across the different types of residence. Also, it is important to note that majority of the respondents lived in Flats (68.7%), and are closely followed by those who live in Bungalows, while the least common type of residence among the respondents are the Duplexes.

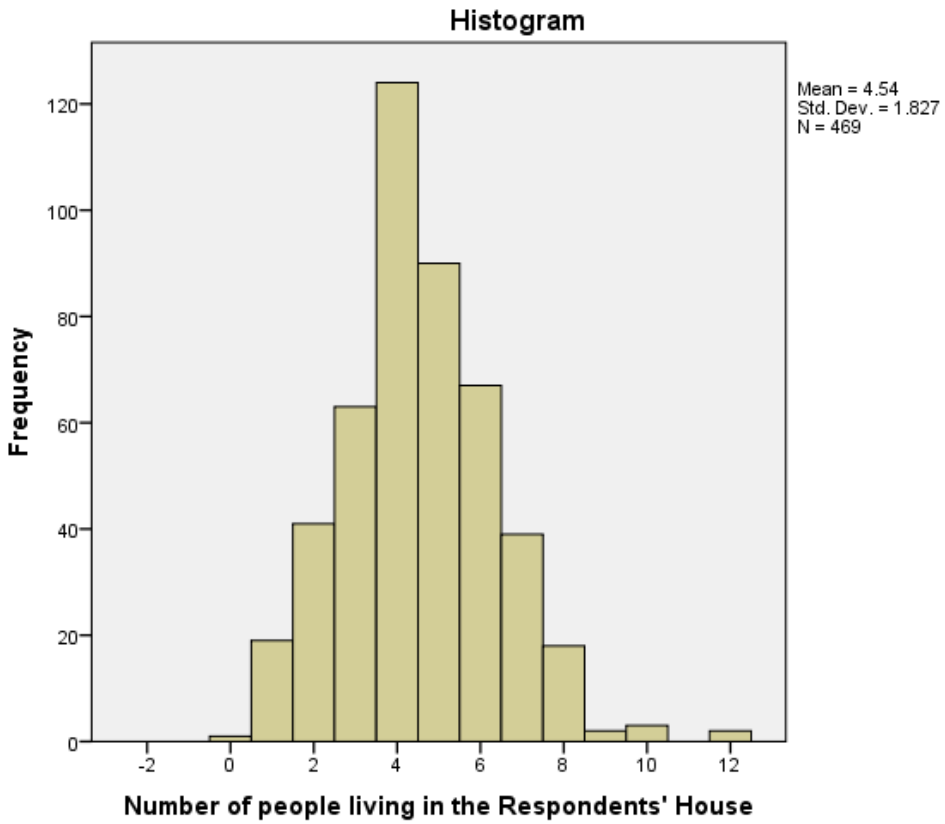


Figure. 6.4 Histogram of the number of people living in the Respondents' House

Looking closely at the histogram, the distribution of the data seem to follow a normal distribution. It can also be seen that average (mode) number of people living in the house of the respondent is 4 although there appear to be an outlier values for respondents who have more than 12 people living in the house.

6.05 Analysis of sustainability indicators questions.

Section A of the questionnaire measures the satisfaction of respondents with affordable sustainable construction from inception using sustainability indicators. Respondents were asked about the level of satisfaction with the following in their homes;

- Day-lighting
- Cross Ventilation
- Drainage and Plumbing
- Access to Safe Water
- Sufficient Living Space
- Good Sanitation
- Good Healthy Environment
- Building Material Used
- Space Planning and Layout
- Power Generation- Mains
- Power Generation- Generator
- Power Generation- Inverter

		Purpose of this survey is to analyse the sustainability impact of design and technology on affordable housing production in Lagos state.					
		How satisfied are you with the following in your home.	**Not Satisfied**	**Satisfied**	**Very Satisfied**		
A		**Sustainability Indicator**					
1		DAY LIGHTING					
2		CROSS VENTILATION					
3		DRAINAGE + PLUMBING					
4		ACCESS TO SAFE WATER					
5		SUFFICIENT LIVING SPACE					
6		GOOD SANITATION					
7		GOOD HEALTHY ENVIRONMENT					
8		BUILDING MATERIALS USED					
9		SPACE PLANNING AND LAYOUT					
10		POWER GENERATION - Mains					
11		POWER GENERATION - Generator					
12		POWER GENERATION - Inverter					

6.06 Data presentation & description of responses to sustainability indicators

Q1: How satisfied are you with day-lighting in your home?

Table 6.2: Tabular representation of Day-lighting Responses

Daylighting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	71	14.3	14.3	14.3
	Satisfied	250	50.4	50.5	64.8
	Very Satisfied	174	35.1	35.2	100.0
	Total	495	99.8	100.0	
Missing	System	1	.2		
Total		496	100.0		

Table 6.2 shows that there is a significant level of satisfaction with day-lighting in the homes of respondents. Half of the respondents (50.5%) agreed that the day-lighting is satisfactory. More than a third (35.2%) was more than satisfied. Also interesting is that only 14.3% of the respondents were ***not satisfied*** with the day lighting in their home.

Analysis

The amount of respondents giving a positive response of satisfied shows that day-lighting as designed by the architects for the building has been completed to client's satisfaction. It shows that building layout and orientation parameters relative to the direction of the sun is good and therefore artificial lighting costs will be reduced. The inhabitants not satisfied as a percentage of the whole are small in number and give credence to the quality of day-lighting.

Q2: How satisfied are you with cross ventilation in your home?

Table 6.3: Tabular representation of Cross Ventilation Responses

Cross Ventilation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	69	13.9	14.0	14.0
	Satisfied	240	48.4	48.6	62.6
	Very Satisfied	185	37.3	37.4	100.0
	Total	494	99.6	100.0	
Missing	System	2	.4		
Total		496	100.0		

There seem to be a similar pattern of response to question 2 as it was presented in question 1. Nearly half of the respondents (48.6%) were satisfied with the cross-ventilation in their homes. Slightly more than a third (37.4%) opted for the very satisfied response while only a few respondents (14%) indicated the not satisfied option.

Analysis

The number of respondents giving a positive response of satisfied shows that cross ventilation as designed by the architects for the building has been completed to clients' satisfaction. It shows that building layout and orientation parameters relative to ideal wind direction have been well thought out design wise, hopefully expensive air-conditioning requirements will be minimized. The inhabitants not satisfied as a percentage of the whole are small in comparison.

Q3: How satisfied are you with drainage and plumbing in your home?

Table 6.4: Tabular representation of drainage and plumbing responses

Drainage and Plumbing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	146	29.4	29.5	29.5
	Satisfied	204	41.1	41.2	70.7
	Very Satisfied	145	29.2	29.3	100.0
	Total	495	99.8	100.0	
Missing	System	1	.2		
Total		496	100.0		

Table 6.4 shows clearly that 41.2% of the respondents were ***satisfied*** with the drainage and plumbing in their homes. However, there is barely any difference between the responses of who were not satisfied and those who were very satisfied.

Analysis

The amount of respondents giving a positive response of satisfied shows that drainage and plumbing as designed by the architects for the building has been completed to clients‘ satisfaction. It indicates that mechanical and plumbing design and installation has been properly fixed. The inhabitants not satisfied as a percentage of the whole are small in comparison.

Q4: How satisfied are you with access to safe water in your home?

Table 6.5: Tabular representation of access to safe water responses

Access to Safe Water

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	191	38.5	38.7	38.7
	Satisfied	183	36.9	37.0	75.7
	Very Satisfied	120	24.2	24.3	100.0
	Total	494	99.6	100.0	
Missing	System	2	.4		
Total		496	100.0		

In response to the question 4, 38 percent of the respondents indicated that they were not satisfied with their access to safe water yet; Table 6.5 seems to indicate that there is a very small difference between the different levels of responses by the respondents.

Analysis

The amount of respondents giving a positive response of satisfied shows that access to safe water as designed by the architects for the building has been completed to clients' satisfaction. It shows that water supply design and installation could be improved. The inhabitants not satisfied as a percentage of the whole are similar in numbers to those who are satisfied in comparison.

Q5: How satisfied are you with sufficient living space in your home?

Table 6.6: Tabular representation of sufficient living space in homes responses

Sufficient living Space

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	95	19.2	19.3	19.3
	Satisfied	256	51.6	51.9	71.2
	Very Satisfied	142	28.6	28.8	100.0
	Total	493	99.4	100.0	
Missing	System	3	.6		
Total		496	100.0		

Table 6.6 shows that very few respondents (19.3%) were ***not satisfied*** with the living space available in their homes, while 28.8% were ***very satisfied***. However, more than half of the respondents (51.9%) indicated they were ***satisfied*** with sufficient living space in their homes.

Analysis

The amount of respondents giving a positive response of satisfied shows that the sufficient living space as designed by the architects for the building has been completed to users 'satisfaction. It shows that sufficient living space design has not been jeopardized in anyway. The area for each of the spaces such as the rooms and living areas seems sufficient for the users. The inhabitants not satisfied as a percentage of the whole are much smaller in numbers to those who are satisfied and very satisfied in comparison. It seems the unsatisfied ones also live with a number of other people in the abode.

Q6: How satisfied are you with good sanitation in your home?

Table 6.7: Tabular representation of good sanitation in homes responses

Good Sanitation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	85	17.1	17.2	17.2
	Satisfied	259	52.2	52.4	69.6
	Very Satisfied	150	30.2	30.4	100.0
	Total	494	99.6	100.0	
Missing	System	2	.4		
Total		496	100.0		

As the table indicates, more than half of the respondents (52.4%) were satisfied with the sanitation of their homes. 30.4% of the respondents were very satisfied. Only a few respondents (17.2%) expressed they were not satisfied with the sanitation of their homes.

Analysis

The amount of respondents giving a positive response of satisfied gives the impression their sanitation levels are high and that they maintain a good level of cleanliness. However on the researchers visit to estates it is apparent that the homes and estates are not well kept. Outside of the existing buildings the paintwork is in dire need of refurbishment, and there is waste littered in areas.

It shows that good sanitation has been compromised and it is not reflective of the conditions of the buildings. The inhabitants who are not satisfied as a percentage of the whole are much smaller in numbers to those who are satisfied and very satisfied in comparison. It seems the unsatisfied ones also live with a number of other people in the abode. However, the researcher is prone to agree with the Not Satisfied interviewees.

Q7: How satisfied are you with good healthy environment in your home?

Table 6.8: Tabular representation of good healthy environment in homes responses

Good Healthy Environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	84	16.9	16.9	16.9
	Satisfied	256	51.6	51.6	68.5
	Very Satisfied	156	31.5	31.5	100.0
	Total	496	100.0	100.0	

51.6% of respondents indicated that were satisfied with the hygiene of the environment in their homes. 31.5% agreed that they were very satisfied while only 16.9% stated they were not satisfied. Altogether most of the respondents expressed their satisfaction with healthy environment of their homes.

Analysis

The amount of respondents giving a positive response of satisfied gives the impression they live in a good healthy environment and that they maintain a good level of cleanliness. However on the researchers visit to estates it is apparent that the homes and estates are not in a good healthy environment. For example outside of the existing buildings the environment is not nice and you have overflowing drainage, litter in places, walls with dirt and graffiti.

It shows that a good healthy environment has been compromised and it is not reflective of the conditions.

Q8: How satisfied are you with the building material used in your home?

Table 6.9: Tabular representation of building material used in homes responses

Building Materials Used

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	109	22.0	22.1	22.1
	Satisfied	250	50.4	50.7	72.8
	Very Satisfied	134	27.0	27.2	100.0
	Total	493	99.4	100.0	
Missing	System	3	.6		
Total		496	100.0		

22.1% of respondents stated that they were not satisfied with the building material used in their homes. Upon further investigation of the table, it can be observed that more than three-quarters of the respondents (77.2%) were satisfied or very satisfied with the building materials used for their homes while a significant number of respondents indicated they were very satisfied.

Analysis

The amount of respondents giving a positive response of satisfied gives the impression they like the building materials used. However on the researchers visit to estates it is apparent that the homes and estates are not originally built with good building materials. For example outside of the existing buildings the plaster and masonry is cracking and in a state of disrepair. The researcher feels the period for maintenance needs to be inserted in the lease agreement from the onset.

It also shows that the building material used are not able to remain in good condition for this length of time. Consequently the building materials used should be readily available, durable and the skill set for installation be easily transferable.

Q9: How satisfied are you with the space planning and layout in your home?

Table 6.10: Tabular representation of space planning and layout in homes responses

Space Planning and Layout

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	113	22.8	23.2	23.2
	Satisfied	264	53.2	54.1	77.3
	Very Satisfied	111	22.4	22.7	100.0
	Total	488	98.4	100.0	
Missing	System	8	1.6		
Total		496	100.0		

In response to the question of space planning and layout, the most of the respondents were satisfied, accounting for more than half of the responses (54.1%). The next most common response to the question was not satisfied with 23.2%, which is slightly greater than the response not satisfied with 22.7%.

Analysis

The number of residents not satisfied is almost similar to the numbers who are very satisfied. This is a good testimony to the skill of the designers as they are directly responsible for the space planning and layout of the units. The design and planning of all the spaces is essential to the ambience realized in the property. However it can be argued that the density of each of the units is too high as the majority of the flats seems highly populated and the families accommodated range from 4 in number to 6.

Q10: How satisfied are you with power generation-mains in your home?

Table 6.11: Tabular representation of power generation - mains in homes responses

Power Generation- Mains

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	305	61.5	62.5	62.5
	Satisfied	156	31.5	32.0	94.5
	Very Satisfied	27	5.4	5.5	100.0
	Total	488	98.4	100.0	
Missing	System	8	1.6		
Total		496	100.0		

Table 10 shows that more than half of the respondents (62.5%) were ***not satisfied*** with the power generation from the mains. A considerable number of respondents (32%) were ***satisfied*** with power generation. Only a few (5.5%) were ***very satisfied*** with power generation from the mains. The interpretation of this result may not be far-fetched as the power situation in the country has deteriorated over the years leading to frustration among the populace.

Analysis

The poor power situation in Lagos has made power supply to the housing estates to be very eclectic. The residents are very dissatisfied and this is a reflection of the feelings of the general populace. It is unfortunate that over the years the situation has not improved in the country or local areas.

Q11: How satisfied are you with power generation-generator in your home?

Table 6.12: Tabular representation of power generation - generator in homes responses

Power Generation- Generator

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	200	40.3	50.5	50.5
	Satisfied	159	32.1	40.2	90.7
	Very Satisfied	37	7.5	9.3	100.0
	Total	396	79.8	100.0	
Missing	System	100	20.2		
Total		496	100.0		

50.5% of respondents indicated that they were not satisfied with the power generation by generator. More than a third of respondents (40.2%) indicated that they were satisfied with the power generation by generators. Interestingly, 9.3% felt very satisfied with the power generation.

Analysis

It is obvious that majority are not happy using generators to service their residences.

It is reported that interests who supply diesel and petrol for the generators are the instigators of the bad power situation. The allegation says that as having good power will not be in their best interests they are sabotaging the electricity industry in order to enrich themselves further. It also goes onto say the privatization being completed in the power sector is being run by this same cartel benefitting from the reliance on diesel and petrol for the generators.

Q12: How satisfied are you with power generation-inverter in your home?

Table 6.13: Tabular representation of power generation - inverter in homes responses

Power Generation- Inverter

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Satisfied	242	48.8	69.7	69.7
	Satisfied	76	15.3	21.9	91.6
	Very Satisfied	29	5.8	8.4	100.0
	Total	347	70.0	100.0	
Missing	System	149	30.0		
Total		496	100.0		

Table 6.13 displays a similar trend that has already been exhibited by respondents to questions 10 because only a minority of the respondents (8.4%) indicated that they were very satisfied with the power generation by inverter. On the other hand, more than half of the respondents (69.7%) indicated that they were not satisfied with the power generation by inverter, while 21.9% were satisfied.

Analysis

There is the need to be inventive and look for alternatives to the cumbersome power situation. Inverters offer another alternative. The inverter has proven to be a cost effective environmentally friendly and silent alternative which also limits the break in transmission caused by the power outage.

The median, as a measure of central tendency, was utilized to locate the average opinion of the respondent as regards to the questions about their level of satisfaction with basic amenities in their homes. The results are presented in the Table below. The categories of rating include 1 (Not Satisfied), 2 (Satisfied), 3 (Very Satisfied).

Table 6.14 shows that most of the respondents indicated their satisfaction with all the sustainability indicators presented in the questionnaire having the median rating = 2 ('satisfied'), with the exception of 'Power Generation-Mains', 'Power Generation-Generator' and 'Power Generation-Inverter' indicators having the median rating = 1 ('not satisfied'). This means that an average respondent is 'satisfied' with each of the sustainability indicators in his home except for power generation where they expressed their dissatisfaction.

Table 6.14: Median ratings of sustainability indicator variables.

Statistics

		Daylighting	Cross Ventilation	Drainage and Plumbing	Access to Safe Water	Sufficient living Space	Good Sanitation	Good Healthy Environment	Building Materials Used	Space Planning and Layout	Power Generation-Mains	Power Generation-Generator	Power Generation-Inverter
N	Valid	495	494	495	494	493	494	496	493	488	488	396	347
	Missing	1	2	1	2	3	2	0	3	8	8	100	149
Median		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00

6.07 Inferential analysis of sustainability indicators

A Chi-Square test was conducted on the response data in Table 6.14 in order to justify that the sample is a representation of the population once the differences between the expected and observed frequencies are significant. The hypothesis is described as follows;

- H_0: There is equal distribution across the response categories in the population
- H_1: There is no equal distribution across the response categories in the population

The Chi-Square results presented in Table 6.14 show that there are differences between the observed and expected responses in all sustainability indicators. The statistics in Table 6.14 above shows that the differences are significant ($p < 0.05$), that is, the differences between the observed and expected frequencies are not due to chance. Hence, there is enough evidence to reject the null hypothesis for all the sustainability indicators and the sample can therefore be inferred to be a representation of the population.

6.08 Analysis of improvement indicators

The set of quantitative data collected under section B of the questionnaire measures the respondents rating of the Lagos state government performances using the improvement indicators. Respondents were asked to rate the Lagos state government in the following areas;

- Adequate and appropriate housing and town planning efforts
- Infrastructure provision in various parts of Lagos
- Water (rivers, lagoon) pollution from debris and waste discharges
- Enforcing occupancy and building use
- Conditions of the roads and transportation
- Training of Home Construction workers
- Conditions of the street drains and accumulation of filth
- Energy savings/conservation and the impact on the environment
- The creation of places that are attractive e.g. parks etc.

The categories of rating include 1 (Poor), 2 (Fair), 3 (Good), 4 (Very Good) and 5 (Excellent).

6.09 Data presentation & descriptive analysis of responses to the improvement indicators

Nine questions on the questionnaire measured the performance of Lagos state in making life enjoyable within the state. Each question has five response categories; poor, fair, good, very good, excellent. In this section, each of the questions is presented for data description and summary.

1. How would you rate Lagos State government performance in the provision of adequate and appropriate housing and town planning effort?

Table 6.15: Tabular representation of adequate and appropriate housing and town planning efforts responses

Adequate and appropriate housing and town planning efforts

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	163	32.9	33.3	33.3
	Fair	161	32.5	32.9	66.1
	Good	137	27.6	28.0	94.1
	Very Good	22	4.4	4.5	98.6
	Excellent	7	1.4	1.4	100.0
	Total	490	98.8	100.0	
Missing	System	6	1.2		
Total		496	100.0		

Table 6.15 compares the responses obtained from the 496 respondents that returned questionnaires although some did not supply an answer to the question (missing). In response to the question, 33.3% of the respondents agreed that the performance was poor, 28% were convinced that the performance was good while a meagre 4.5% indicated that performance was very good. Only 1.4% of respondents agreed that performances were excellent. Upon further investigation of the table, the cumulative percentage column shows that more than 50% of the respondents believe that the Lagos state performance in the provision of adequate and appropriate housing is poor or fair.

Analysis

Majority in this study feel that the government's performance in provision of affordable housing is poor. This confirms responses the researcher has had in the interviews and focus group discussions. This also verifies a main reason for inadequate provision of housing, which can be attributed to poor efforts of the government.

2. How would you rate Lagos State government in infrastructure provision in various parts of the state?

Table 6.16: Tabular representation of infrastructure provision in various parts of Lagos responses

Infrastructure provision in various parts of Lagos

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	151	30.4	30.6	30.6
	Fair	181	36.5	36.7	67.3
	Good	122	24.6	24.7	92.1
	Very Good	30	6.0	6.1	98.2
	Excellent	9	1.8	1.8	100.0
	Total	493	99.4	100.0	
Missing	System	3	.6		
Total		496	100.0		

It is apparent from this table that the overall response to infrastructure provision in Lagos state was negative. 30.6% of the respondents rated the infrastructure provision in the state as poor; likewise, 36.7% of the respondents also rated the state performance fair. Although, 24.6% of the respondents considered the infrastructure provision as good, very few of the respondents considered the performance of Lagos either very good or excellent with a combined cumulative percentage of 7.9%.

Analysis

A large number in this study feel that the government's performance in the provision of infrastructure is poor. This confirms responses the researcher has had in the interviews and focus group discussions. This also verifies a main reason for inadequate provision of infrastructure which can be attributed to poor efforts of the government. As infrastructure is generally capital-intensive and communal its provision is usually in the domain of the government. The lack or deterioration of it is also attributed to the government such as poorly maintained road network, poor drainage, lack of pipe borne water, poor supply of electricity etc.

3. How would you rate Lagos State government performance in the management of water (rivers, lagoon) pollution from debris and waste discharges?

Table 6.17: Tabular representation of water (rivers, lagoon) pollution from debris and waste discharges responses

Water (rivers, lagoon) pollution from debris and waste discharge

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	140	28.2	28.7	28.7
	Fair	195	39.3	40.0	68.6
	Good	115	23.2	23.6	92.2
	Very Good	24	4.8	4.9	97.1
	Excellent	14	2.8	2.9	100.0
	Total	488	98.4	100.0	
Missing	System	8	1.6		
Total		496	100.0		

As can be seen from the data in Table 6.17 that more than a third of the respondents (40%) rated the state fair in the management of the water pollution from debris and waste discharges, 28.7% rated the state poor, approximately 23.6% were convinced that the performance of the state was good. 4.9% of respondents indicated that the performance of the state was very good while, only 2.9% agreed the performance was excellent.

Analysis

The drainage and waste disposal in the state is in dire need of an overhaul, as waste is thrown into the lagoons, creeks, canals, gutters and even the ocean. There needs to be a concerted effort from all the government agencies to ensure no one tips waste into the water bodies and, if found, a heavy fine or penalty should be levied on the offending individual or organisation. The damage caused by pollution of this water bodies is enormous and the impact is felt far afield. There is a health risk as the water becomes contaminated and there is infestation and also possible spread of germs and bacteria in the environs.

4. How would you rate Lagos State government performance in enforcing occupancy and building use?

Table 6.18: Tabular representation of enforcing occupancy and building use responses

Enforcing occupancy and building use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	142	28.6	29.5	29.5
	Fair	162	32.7	33.7	63.2
	Good	148	29.8	30.8	94.0
	Very Good	26	5.2	5.4	99.4
	Excellent	3	.6	.6	100.0
	Total	481	97.0	100.0	
Missing	System	15	3.0		
Total		496	100.0		

The table above illustrates that the most common response to the question of enforcing occupancy and building use is to answer FAIR (33.7%), which seem to indicate the overall consensus of the respondents. The next most common responses were GOOD and POOR at 30.8% and 29.5% respectively. In the minority were respondents who indicated VERY GOOD at 5.4% and EXCELLENT at less than a percent (0.6%).

Analysis

Building use is important especially in a high density area such as Lagos and its environs. Its important to maximise occupancy of houses available and ensure an even distribution across the state. Some parts of the state have a low occupancy and there are approximately 3 - 4 member families living in a detached house in Lekki, while in other areas there are 8-10 member families living in a two bed flat in, for example, Makoko.

5. How would you rate Lagos State government performance in managing the condition of the roads and transportation?

Table 6.19: Tabular representation of the condition of the roads and transportation

Conditions of the roads and transportation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	161	32.5	32.8	32.8
	Fair	188	37.9	38.3	71.1
	Good	103	20.8	21.0	92.1
	Very Good	34	6.9	6.9	99.0
	Excellent	5	1.0	1.0	100.0
	Total	491	99.0	100.0	
Missing	System	5	1.0		
Total		496	100.0		

In response to the question, majority of the respondents (38.3%) indicated that the conditions of the roads and transportation is FAIR, although 32.8% responded by indicating the conditions were POOR. Other responses to this questions included; 21% for GOOD, 6.9% for VERY GOOD and 1% for EXCELLENT response category.

Analysis

As noted by the respondents the condition of the roads and transportation is really bad. Roads are in the purview of the state government and it is essential they own it and maintain it. The tussle between the state government and the federal government on which road belongs to who, for tolling, repair and jurisdiction purposes needs to be resolved promptly to ensure proper and timely maintenance.

6. How would you rate Lagos State government performance in training of home construction workers?

Table 6.20: Tabular representation of the Lagos state government performance in training of home construction workers

Training of Home construction workers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	153	30.8	32.8	32.8
	Fair	168	33.9	36.1	68.9
	Good	118	23.8	25.3	94.2
	Very Good	22	4.4	4.7	98.9
	Excellent	5	1.0	1.1	100.0
	Total	466	94.0	100.0	
Missing	System	30	6.0		
Total		496	100.0		

The table above illustrates that there is slight difference between the number of respondents who indicated POOR and FAIR response categories with 32.8% and 36.1% respectively. In the same way as previous questions, the responses VERY GOOD and EXCELLENT both have a combined cumulative of less than 10%. Although, a considerable number of respondents (25%) felt the state was GOOD in their performance concerning the training of Home construction workers.

Analysis

The quality of artisans' work has fallen over the years, hence the finished products we see in the houses built is poor. If we are going to replicate houses to get the economics of scale right and get the financial benefit to do more it is important to have a skilled workforce.

In other countries in West Africa and abroad the apprenticeship scheme and further training available to construction workers is tremendous. The Lagos state government has commenced having apprenticeship training schools with the Apprenticeship training Program (ATP) Lagos state technical, vocational and education board (LASTVEB).

7. How would you rate Lagos State government performance in managing the conditions of the street drains and accumulation of filth?

Table 6.21: Tabular representation of the conditions of the street drains and accumulation of filth

Conditions of the street drains and accumulation of filth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	188	37.9	38.3	38.3
	Fair	148	29.8	30.1	68.4
	Good	104	21.0	21.2	89.6
	Very Good	41	8.3	8.4	98.0
	Excellent	10	2.0	2.0	100.0
	Total	491	99.0	100.0	
Missing	System	5	1.0		
Total		496	100.0		

Tabular representation of conditions of the street drains and accumulation of filth responses

As can be seen from the data in Table above that 38.3% of the respondents rated the state POOR in the management of street drains and accumulation of filth, 30.1% indicated FAIR, approximately 22% were convinced that the performance of the state was GOOD and 8.4% stated that the state performance is VERY GOOD. Only a few respondents (2%) felt that the performance of the state was EXCELLENT. All in all, waste management has always been a big problem in the state as many residents use uncomplimentary means in the disposal of the waste generated in their homes or at the market.

Analysis

The street drains are unclean and clogged up for all to see and the ones in the estates are just as bad. The filth thrown in clogs it up and makes the management and free flow of it near impossible.

The filth and street drain is an unhealthy sight that could allow disease infestation and transmission especially malaria fever which only needs standing pools of water to spread.

8. How would you rate Lagos State government performance in energy savings/conservation and impact on the environment?

Table 6.22: Tabular representation of energy savings/conservation and the impact on the environment responses

Energy savings/conservation and the impact on the environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	199	40.1	42.1	42.1
	Fair	126	25.4	26.6	68.7
	Good	128	25.8	27.1	95.8
	Very Good	16	3.2	3.4	99.2
	Excellent	4	.8	.8	100.0
	Total	473	95.4	100.0	
Missing	System	23	4.6		
Total		496	100.0		

The majority of respondents (42.1%) felt that the state is POOR in handling the energy savings and impact on the environment. Over a quarter of the respondents (26.6%) indicated that the state performance was FAIR, 18% agreed the state was GOOD and 3.4% rated the state performance as VERY GOOD. Only a small number of respondents (0.8%) indicated that the state performance was EXCELLENT.

Analysis

Energy savings have been tried by the government in the areas of street lights and have been quite unsuccessful. It was lauded as a great idea initially, but it soon became apparent that the quality of the products would not last as many became non-functional.

9. How would you rate Lagos State government performance in the creation of places that are attractive?

Table 6.23: Tabular representation of the creation of places that are attractive

The creation of places that are attractive

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	175	35.3	36.5	36.5
	Fair	120	24.2	25.0	61.5
	Good	126	25.4	26.3	87.7
	Very Good	42	8.5	8.8	96.5
	Excellent	17	3.4	3.5	100.0
	Total	480	96.8	100.0	
Missing	System	16	3.2		
Total		496	100.0		

The most striking result to emerge from the data in the table above is that more than half (61.5%) of those who responded to the question felt the state has not done enough in the creation of places that are attractive. These include those who answered to poor or fair. On the other hand, only a few respondents answered on the contrary with a cumulative percent of 38.5%. These include those who answered to GOOD, VERY GOOD, and EXCELLENT.

In addition, the table below illustrates the median of responses in each improvement indicator question assessing Lagos state government performance. The table shows that respondents agreed that the Lagos state government was 'Fair' in its performance with a Median rating = 2.00.

Table 6.24: Tabular representation of the median ratings of improvement indicator variables

Statistics

		Adequate and appropriate housing and town planning efforts	Infrastructure provision in various parts of Lagos	Water (rivers, lagoon) pollution from debris and waste discharge	Enforcing occupancy and building use	Conditions of the roads and transportation	Training of Home construction workers	Conditions of the street drains and accumulation of filth	Energy savings/conservation and the impact on the environment	The creation of places that are attractive
N	Valid	490	493	488	481	491	466	491	473	480
	Missing	6	3	8	15	5	30	5	23	16
Median		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

6.10 Inferential analysis of improvement indicators

One sample chi-square test was utilized while analyzing the improvement indicator variables to ascertain that the responses across the categories are similar or different by comparing the observed and expected data.

The null hypothesis is described as follows

H_0: The responses for the rating categories are equally distributed.

H_1: The responses for the rating categories are not equally distributed.

The results of Chi-Square test presented in Table 6.25 show that there are differences in the observed and expected responses. However, Table 6.26 show that the differences between the observed and expected are significant ($p < 0.05$, DF=2). Hence, there is enough evidence to reject the null hypothesis and the sample can therefore be inferred to be a representation of the population.

Table 6.25: Tabular representation of the frequencies of responses on sustainability indicators

	Adequate and appropriate Housing and Town planning Efforts		**Infrastructure provision in various parts of Lagos**		**Water Pollution from Debris and waste discharges**		**Enforcing Occupancy and Building**	
	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected
Poor	163	98.0	151	98.6	140	97.6	142	96.2
Fair	161	98.0	181	98.6	195	97.6	162	96.2
Good	137	98.0	122	98.6	115	97.6	148	96.2
Very Good	22	98.0	30	98.6	24	97.6	26	96.2
Excellent	7	98.0	9	98.6	14	97.6	3	96.2
	Conditions of the roads and transportation		**Training of home construction workers**		**Conditions of the Streets drains and accumulation of filth**		**Energy Savings/Conservation and impact on the environment**	
Poor	161	98.2	153	93.2	188	98.2	199	94.6
Fair	188	98.2	168	93.2	148	98.2	126	94.6
Good	103	98.2	118	93.2	104	98.2	128	94.6
Very Good	34	98.2	22	93.2	41	98.2	16	94.6
Excellent	5	98.2	5	93.2	10	98.2	1	94.6

	The Creation of places that are attractive
	Observed	Expected
Poor	175	96.0
Fair	120	96.0
Good	126	96.0
Very Good	42	96.0
Excellent	17	96.0

Table 6.26: Tabular representation of Chi-Square statistics of the responses on the sustainability indicators

Test Statistics

	Adequate and appropriate housing and town planning efforts	Infrastructure provision in various parts of Lagos	Water (rivers, lagoon) pollution from debris and waste discharge	Enforcing occupancy and building use	Conditions of the roads and transportation	Training of Home construction workers	Conditions of the street drains and accumulation of filth	Energy savings/conservation and the impact on the environment	The creation of places that are attractive
Chi-Square	242.571	231.412	245.832	236.225	252.941	242.863	220.253	289.505	175.771
df	4	4	4	4	4	4	4	4	4
Asymp. Sig.	.000	.000	.000	.000	.000	.000	.000	.000	.000

Spearman's rank correlation was used to test the strength of the association between the responses to different questions used as ordinal measures for improvement indicators. The test also evaluated to which extent cases with high ranking in one variable were observed to have similar rankings on another variable.

The hypothesis is stated as follows;

H_0: There is no association between the two variables [in the population].

H_1: There is an association between the two variables [in the population].

Table presents the correlation matrix between all combinations of variables used as an improvement indicator. A weak direct correlation (relationship) exists between any two variables in the spearman's rank correlation matrix and each correlation coefficient was statistically significant at $p < 0.01$. Therefore, it can be concluded that the higher the ranking by respondents in any one of the variables, the higher the ranking in another variable, and vice versa.

Table 6.27: Tabular representation of Correlation matrix of Spearman's Correlation Coefficients of improvement indicators

Correlations

			Adequate and appropriate housing and town planning efforts	Infrastructure provision in various parts of Lagos	Water (rivers, lagoon) pollution from debris and waste discharge	Enforcing occupancy and building use	Conditions of the roads and transportation	Training of Home construction workers	Conditions of the street drains and accumulation of filth	Energy savings/conservation and the impact on the environment	The creation of places that are attractive
Spearman's rho	Adequate and appropriate housing and town planning efforts	Correlation Coefficient	1.000	.655	.492	.596	.426	.461	.526	.589	.478
		Sig. (2-tailed)	.	.000	.000	.000	.000	.000	.000	.000	.000
	Infrastructure provision in various parts of Lagos	Correlation Coefficient	.655	1.000	.550	.600	.469	.447	.524	.580	.457
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000	.000	.000
	Water (rivers, lagoon) pollution from debris and waste discharge	Correlation Coefficient	.492	.550	1.000	.501	.490	.494	.432	.429	.323
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000	.000	.000
	Enforcing occupancy and building use	Correlation Coefficient	.596	.600	.501	1.000	.503	.505	.565	.564	.475
		Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000	.000
	Conditions of the roads and transportation	Correlation Coefficient	.426	.469	.490	.503	1.000	.619	.533	.496	.447
		Sig. (2-tailed)	.000	.000	.000	.000	.	.000	.000	.000	.000
	Training of Home construction workers	Correlation Coefficient	.461	.447	.494	.505	.619	1.000	.573	.535	.434
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.	.000	.000	.000
	Conditions of the street drains and accumulation of filth	Correlation Coefficient	.526	.524	.432	.565	.533	.573	1.000	.626	.515
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.	.000	.000
	Energy savings/conservation and the impact on the environment	Correlation Coefficient	.589	.580	.429	.564	.496	.535	.626	1.000	.563
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.	.000
	The creation of places that are attractive	Correlation Coefficient	.478	.457	.323	.475	.447	.434	.515	.563	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.

6.11 Data presentation & description of responses to affordability indicators

Six questions on the questionnaire were categorized under the affordability indicators to measure the performance of the Lagos state government in making house production affordable within the state. Each question has five response categories; POOR, FAIR, GOOD, VERY GOOD, EXCELLENT. In this section, each of the questions is presented for data description and summary.

1. **How would you rate Lagos state performance in the cost of living?**

Table 6.28: Tabular representation of Lagos state performance in the cost of living

The cost of living

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	260	52.4	52.7	52.7
	Fair	115	23.2	23.3	76.1
	Good	113	22.8	22.9	99.0
	Very Good	3	.6	.6	99.6
	Excellent	2	.4	.4	100.0
	Total	493	99.4	100.0	
Missing	System	3	.6		
Total		496	100.0		

In response to the question, approximately 53% of the respondents indicated that the performance of the state was POOR, 23.2% of the respondents considered the state performance as FAIR, 22.9% felt the state performance was GOOD while 0.6%. Only a few respondents (0.4%) indicated that the state performance was EXCELLENT.

2. **How would you rate Lagos state government performance in the cost of building houses?**

Table 6.29: Tabular representation of Lagos state performance in the cost of building houses

Cost of building houses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	278	56.0	56.5	56.5
	Fair	140	28.2	28.5	85.0
	Good	66	13.3	13.4	98.4
	Very Good	7	1.4	1.4	99.8
	Excellent	1	.2	.2	100.0
	Total	492	99.2	100.0	
Missing	System	4	.8		
Total		496	100.0		

The most striking observation to emerge from the data comparison in the table above is that more than three-quarters (85%) of those who responded to the question concluded that the state has not

done enough in subsidizing the cost of building houses. This category of respondents includes those who answered to POOR (56.5%) or FAIR (28.5%). On the other hand, only a few respondents answered on the contrary with a remaining cumulative percent of 15%. This category of respondents includes those who answered to GOOD (13.4%), VERY GOOD (1.4%), and EXCELLENT (0.2%).

3. How would you rate Lagos state government performance in property management of their estates?

Table 6.30: Tabular representation of Lagos state property management of their estates

Property management of their estates

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	228	46.0	46.7	46.7
	Fair	171	34.5	35.0	81.8
	Good	72	14.5	14.8	96.5
	Very Good	10	2.0	2.0	98.6
	Excellent	7	1.4	1.4	100.0
	Total	488	98.4	100.0	
Missing	System	8	1.6		
Total		496	100.0		

In response to the question, majority of the respondents (46.7%) indicated that the state performance in property management of their estates was POOR, although 35% felt the state performance was FAIR. Other responses to this questions included; 14.8% for GOOD, 2% for VERY GOOD and 1.4% for EXCELLENT response categories.

4. How would you rate Lagos state government performance in financing of housing development?

Table 6.31: Tabular representation of Lagos state government performance in financing of housing development

Financing of housing development

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	252	50.8	53.4	53.4
	Fair	150	30.2	31.8	85.2
	Good	50	10.1	10.6	95.8
	Very Good	16	3.2	3.4	99.2
	Excellent	4	.8	.8	100.0
	Total	472	95.2	100.0	
Missing	System	24	4.8		
Total		496	100.0		

More than half of the respondents (53.4%) felt that the state performance was POOR in financing of housing development. Nearly a third of the respondents (31.8%) rated the state performance as FAIR, 10.6% agreed the state was GOOD while 3.4% rated the state performance as VERY GOOD. Only a small number of respondents (2%) indicated that a performance of the state was VERY GOOD.

5 How would you rate Lagos state government performance in affordability of a property like this for a newly married couple?

Table 6.32: Tabular representation of affordability of a property like this for a newly married couple

Affordability of a property like this for a newly married couple

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	260	52.4	54.5	54.5
	Fair	126	25.4	26.4	80.9
	Good	70	14.1	14.7	95.6
	Very Good	16	3.2	3.4	99.0
	Excellent	5	1.0	1.0	100.0
	Total	477	96.2	100.0	
Missing	System	19	3.8		
Total		496	100.0		

---As can be seen from the data in Table above that more than half of the respondents (54.5%) rated the state POOR in the management of street drains and accumulation of filth, 26.4% indicated FAIR, approximately 15% were convinced that the performance of the state was GOOD while less than 5% rated the state performance as VERY GOOD. Only 1% indicated that the performance of the state was EXCELLENT.

6.12 Inferential analysis of affordability indicators

One sample chi-square test (goodness of fit) was used to validate that the sample is a representation of the population by detecting the significance of the difference between the expected and observed frequencies. The null hypothesis states that responses for the rating categories are equally distributed. The results of Chi-Square test presented in Table 6.33 suggest that there are differences in the observed and expected responses (null hypothesis). The test statistics in Table 6.34 confirms that the differences between the observed and expected are significant ($p < 0.05$, DF=2). Hence, there is enough evidence to reject the null hypothesis and suggest that the responses for the rating categories are not equally distributed. The sample can therefore be inferred to be a representation of the population.

Table 6.33: Tabular representation of frequencies of responses on affordability indicators

	Cost of Living		**Cost of Building Houses**		**Property Management of an Estate**		**Financing of Housing Development**	
	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected
Poor	260	98.6	278	98.4	228	97.6	252	94.4
Fair	115	98.6	140	98.4	171	97.6	150	94.4
Good	113	98.6	66	98.4	72	97.6	50	94.4
Very Good	3	98.6	7	98.4	10	97.6	16	94.4
Excellent	2	98.6	1	98.4	7	97.6	4	94.4

	Home Loans for prospective home owners		**Affordability of a property like this for a newly married couple**	
Poor	300	93.6	260	95.4
Fair	105	93.6	126	95.4
Good	53	93.6	70	95.4

Very Good	8	93.6	16	95.4
Excellent	2	93.6	5	95.4

Table 6.34: Tabular representation of Test Statistics

Test Statistics

	The cost of living	Cost of building houses	Property management of their estates	Financing of housing development	Home loans for prospective home owners	Affordability of a property like this for a newly married couple
Chi-Square	456.361	537.370	398.865	468.424	642.064	452.319
df	4	4	4	4	4	4
Asymp. Sig.	.000	.000	.000	.000	.000	.000

Spearman's rank correlation test was used to test the strength of the association between the different variables of the affordability indicators to evaluate to which extent cases with high ranking in one variable were observed to have similar rankings on another variable.

The hypothesis is stated as follows;

H_0: There is no association between the two variables [in the population].

H_1: There is an association between the two variables [in the population].

The table presents the spearman's rank correlation matrix between all combinations of variables used as a question in section C (affordability indicator) of the questionnaire. A weak direct correlation (relationship) exists between any two variables in the multiple Spearman's rho correlation of the affordability indicators to indicate that there is association between each of the variables and each correlation coefficient was statistically significant at $p < 0.01$. Therefore, it can be concluded that the higher the ranking by respondents in any one of the variables, the higher the ranking in another variable, and vice versa.

Table 6.35: Tabular representation of Correlation matrix of Spearman's rho Correlation Coefficients of affordability indicators

Correlations

			The cost of living	Cost of building houses	Property management of their estates	Financing of housing development	Home loans for prospective home owners	Affordability of a property like this for a newly married couple
Spearman's rho	The cost of living	Correlation Coefficient	1.000	.698	.541	.538	.527	.477
		Sig. (2-tailed)	.	.000	.000	.000	.000	.000
		N	493	489	485	469	465	476
	Cost of building houses	Correlation Coefficient	.698	1.000	.540	.560	.520	.511
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000
		N	489	492	486	472	468	476
	Property management of their estates	Correlation Coefficient	.541	.540	1.000	.646	.522	.559
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000
		N	485	486	488	470	466	472
	Financing of housing development	Correlation Coefficient	.538	.560	.646	1.000	.661	.607
		Sig. (2-tailed)	.000	.000	.000	.	.000	.000
		N	469	472	470	472	461	460
	Home loans for prospective home owners	Correlation Coefficient	.527	.520	.522	.661	1.000	.635
		Sig. (2-tailed)	.000	.000	.000	.000	.	.000
		N	465	468	466	461	468	459
	Affordability of a property like this for a newly married couple	Correlation Coefficient	.477	.511	.559	.607	.635	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.
		N	476	476	472	460	459	477

6.13 Analysis of variance test

One-way analysis of variance procedure was used to compare the number of people living with the respondents within the different types of residence which include; Bungalow, Flats and Houses. The null hypothesis states that there is no significant difference between the numbers of people living within the types of residences indicated by the respondents. The Descriptive table presents the means and standard deviation of the Respondents' residences. The one way analysis of variance revealed a significant difference between the groups in regards to the number of people living within the different residences of the respondents .The ANOVA table shows that the Sig. value = 0.469. Since 0.014 < 0 .05, our conclusion is to reject the null hypothesis (H_0) and conclude that the mean number of people living in the Respondents' house is not equal.

Table 6.36: Tabular representation of Number of people living in the respondent's house - Descriptives

Descriptives

Number of people living in the Respondents' House

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Bungalow	133	4.41	1.871	.162	4.09	4.73	1	12
Flats	325	4.53	1.791	.099	4.34	4.73	0	12
Duplex	11	6.09	1.814	.547	4.87	7.31	4	10
Total	469	4.54	1.827	.084	4.37	4.70	0	12

Table 6.37: Tabular representation of Number of people living in the respondent's house - ANOVA

ANOVA

Number of people living in the Respondents' House

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	28.594	2	14.297	4.343	.014
Within Groups	1534.075	466	3.292		
Total	1562.670	468			

6.14 Main key findings and implications of data

The analysis has revealed a number of outcomes and its impact on research including the implications on the framework is as follows:

- Identify the target audience(s). These might include developers, financiers, service providers, civil society organizations, the media, the general population, the inhabitants, government and donors.
- Think about the methods of dissemination: presentations, media conferences, press releases, press kits, seminars, theatre, artwork, songs, films and so on.
- Issue a working paper/brief alongside the publication of the survey results to interpret the data, making the tool easier to use for advocacy and further research purposes.
- Develop a strategy for dealing with the response from the media and the surveyed institutions/housing occupiers.
- Avoid confrontation with the developers/institutions/government agencies that have been rated as the worst performing ones by publicly explaining the methodology and the outcome.
- Emphasize the usefulness of the findings, for example, in policy making and impact on future research.
- Make recommendations to bring about positive change.

Continue monitoring to measure any changes over time and the pattern of such changes (Sohail & Cavill, 2007).

The questions and answers analysed have revealed the following attributes for the framework:

1. A need for the voices of the inhabitants to be heard in policy discussions – The answers to the questions under section B of the questionnaire (Appendix C) overall will amplify their voices and desires.

2. Ensure publicly provided services are specifically targeted to the needs of the inhabitants – by taking note of their complaints as shown in the survey. Attributes noted for the framework includes cultural aspects of the locality are taken into consideration, breaking barriers, good urban design, teamwork and good feedback processes.

3. Inhabitant's impression of design and technology – Judging by the questionnaire results of section A (Question No. 5 and No. 9 of Appendix C) it seems majority of inhabitants questioned were satisfied with the space planning and sufficient living space provided.

It shows that very few respondents (19.3%) were ***not satisfied*** with the living space available in their homes, while 28.8% were ***very satisfied***. However, more than half of the respondents (51.9%) indicated they were ***satisfied*** with sufficient living space in their homes.

The amount of respondents giving a positive response of being satisfied shows that the sufficient living space as designed by the architects for the building has been completed to users 'satisfaction. It shows that sufficient living space design has not been jeopardized in anyway. The area for each of the spaces such as the rooms and living areas seems sufficient for the users. The inhabitants not satisfied as a percentage of the whole are much smaller in numbers to those who are satisfied and very satisfied in comparison. It seems the unsatisfied ones also live with a number of other people in the abode.

Also in response to the question of space planning and layout, most of the respondents were satisfied, accounting for more than half of the responses (54.1%). The next most common response to the question was not satisfied with 23.2%, which is slightly greater than the response not satisfied with 22.7%.

The number of residents not satisfied is almost similar to the numbers who are very satisfied. This is a good testimony to the skill of the designers as they are directly responsible for the space planning and layout of the units. The design and planning of all the spaces is essential to the ambience realized in the property. However it can be argued that the density of each of the units is too high as the majority of the flats seems highly populated and the families accommodated range from 4 in number to 6.

The attributes distilled for the framework include good design and specifications, value engineering, improvement of knowledge/training, teamwork/collaboration.

4. Inhabitants impression of state government performance - rating Lagos state government performance in the provision of adequate and appropriate housing and town planning efforts revealed the minds of the inhabitants clearly and would send a clear message to the government that inhabitants were not happy with governments efforts thus far as 33.3% rated poor while 32.9% rated fair. As noted already this confirms responses the researcher has had in interviews and focus group discussions. This also verifies a main reason for inadequate provision of housing, which can be attributed to poor efforts of the government.

In the collation of the attributes for framework development political will, supportive government policies and incentives, transparency, guidance and monitoring from government is noted as key factors.

5. Inhabitant's impression of environmental issues and infrastructure. - It is apparent from the results of the survey that the overall response to infrastructure provision in Lagos state was negative.

30.6% of the respondents rated the infrastructure provision in the state as poor; likewise, 36.7% of the respondents also rated the state performance fair. Although, 24.6% of the respondents considered the infrastructure provision as good, very few of the respondents considered the performance of Lagos either very good or excellent with a combined cumulative percentage of 67.3%.

A large number in this study feel that the government's performance in the provision of infrastructure is poor. This confirms responses the researcher has had in the interviews and focus group discussions. This also verifies a main reason for inadequate provision of infrastructure which can be attributed to poor efforts of the government. As infrastructure is generally capital-intensive and communal its provision is usually in the domain of the government. The lack or deterioration of it is also attributed to the government such as poorly maintained road network, poor drainage, lack of pipe borne water, poor supply of electricity etc.

The attributes noted for the framework revolving around Infrastructure and environmental improvement are as noted above - Finance, Design, specification, government policies, monitoring and regulators.

6. Inhabitants impression of existing property – Judging by the responses to questions 1-12 in Section A of the questionnaire (Appendix C) which was drawn up to measure the satisfaction of respondents. It's clear to note the views of the inhabitants as being favourable therefore the attributes carried forward to build up the framework include good design, proper skilled labour, finance, infrastructure and urban planning which aid the outcome of sustainability.

The research is seeking to filter the concerns of the respondents into variables which aid the framework development as the problems of lack of amenities, poor maintenance, strained relationships between public housing residents and management, chronic financial crisis have been mentioned as recurring themes of state controlled public housing.(Davidson, 1999)

Too many governments pretend that they can achieve homeownership for everyone. This is neither achievable nor desirable despite the rhetoric that normally accompanies policy statements. Since everybody can actually not build a house for himself due to many factors which include large amount of money required to build a house, increasing cost of building materials, problems of acquisition of land and low income of many people, the only alternative is to find a place to rent. (Aluko, 2007) (Anon., n.d.)Therefore, rental housing and homeownership should not be competing tenure options. Governments should enable the housing market to provide people with an effective choice of tenure that is affordable

and appropriate to their needs. This requires a housing policy that is 'tenure neutral'. Tenure neutrality means:

- Avoiding favourable tax breaks only for owners.
- Providing subsidies to poor families irrespective of their tenure
- Creating prejudice against any tenure group
- Restricting particular housing sub markets e.g. through rent control (UN Habitat)

The Lagos state governor was quoted as saying they are adopting a hybrid strategy as part of its pragmatic approach to the development of housing in the state. He explained that his administration adopted basic and sustainable housing models for growth, eradication of poverty by creating jobs and securing the society, pointing out that with the numerous housing projects going on across the state as well as those currently awarded for construction, thousands of Lagosians would be employed both directly and indirectly (Kolawole, 2012).

This strategy we are informed consists not only of direct government construction for the underprivileged but also schemes targeted at the middle and upper-middle class where agencies like the Lagos State Development and Property Corporation (LSDPC) will build and sell for profit and the profit will be used by government to fund social housing for the vulnerable members of our society.

For any framework for housing delivery to be successful in Nigeria, government must be adequately in control (where possible) or at least be statistically aware of the demographic structure, population growth (particularly issues on mortality and birth rates), urban-rural migration unplanned settlements/urbanisation rates immigration from neighbouring countries character and distribution of income prices of energy, dilapidation of naturally endowed resources, political instability level/standard of living as well as level of patriotism in the national and a host of others (Madaki & Ogunrayewa, 1999).

6.15 Summary

From the data collection and analysis its shown that there is a need for a framework that would assist in the provision of sustainable housing. This framework would assist the strategy for production of housing for the right sector and ensure a provision of the right type of housing delivering the number of units progressively to satisfy a growing demanding populace.

It was possible to interview those who had been directly or indirectly affected in cases involving infrastructure and housing delivery. After the data was collected and analyzed, the results were shared and interpreted. A transact-walk was also conducted to collect supportive information through direct observation in the study location. The researcher presented the main findings back to stakeholders in a workshop to build consensus and find acceptable solutions to housing delivery problems. Findings are used to reveal the differing perceptions and disproportionate impacts of housing delivery and the infrastructure sector on the inhabitants.

These survey can empower the inhabitants to act as active agents able to understand, anticipate and explore their needs and interests, participate in municipal agenda-setting and help administrations solve the city's infrastructure problems; this will help address the lack of knowledge and power that makes the inhabitants so vulnerable to the inept and corrupt practices of others. This is a far cry from the stereotypical image of the inhabitants as anonymous and passive 'consumers of development'.
Through this survey, the inhabitants have revealed their awareness of, and access to, housing and infrastructure services. They have graded service quality and adequacy, including the treatment they received from providers, voiced their satisfaction and dissatisfaction with the services. They have also rated costs as affordable or beyond their means and shared their experiences in dealing with public officials. These are all vital inputs for policy formulation and have assisted greatly in the framework formulation. The welfare and opinions of the inhabitants must be monitored regularly, to assess whether public and private agencies are becoming more (or less) responsive to their clients.

The data findings have further revealed and confirmed specifically that existing design of the case study housing units are able to withstand the highlighted sustainability indicators which include Day-lighting, Cross Ventilation, Drainage and Plumbing, Access to Safe Water, Sufficient Living Space, Good Sanitation, Good Healthy Environment, Building Material Used, Space Planning and Layout, Power Generation- Mains, Power Generation- Generator, Power Generation- Inverter

A qualitative assessment of the case studies will further reveal the desires of the inhabitants as required.

CHAPTER 7 – QUALITATIVE ASSESSMENT

7.00 Introduction

This is a qualitative assessment of the case studies namely: Jubilee Housing Estate, Ayangburen, Shagamu Road, Ikorodu, Isolo Ire-Akari Estate, Low cost Housing Estate, Jakande low cost housing estate, Ikorodu (blocks of 6 flats each painted green), Jakande Estate Oke-Afa Isolo Lagos, Federal Housing Estate in Ikorodu (Shagari Estate) and other government assisted developments in the various areas of Lagos. It's charting the progress and confirming the output.

Doing a qualitative assessment was projected by the need to answer questions on a housing framework. Qualitative methods have their special strengths in the discovery and generation of hypothesis, but also to get a more in-depth understanding of the ideas and views of a person. Therefore, qualitative designs are often the first step to analyze a topic and should be complemented and/or followed by quantitative approaches when necessary (Schilling, 2006).

While decent housing is important to every individual, it must be re-emphasised that one of the continuing challenges posed by the unmitigated urbanization and influx of people into Lagos is the provision of adequate and sustainable housing.

7.01 Private sector initiatives

One of the first housing estates in Lagos is the Palmgrove Estate on Ikorodu Road built by Cappa and Dalberto in 1954 (Godwin & Hopwood, 2012). Thus the urban nature of Lagos has not only resulted in the phenomenal rise in the population, number and size of settlements in the state, but had also manifested in acute shortage of adequate dwelling units, high rent rates and the emergence of slums.

Despite the many welfare programs competing for government resources and high cost of building materials which have made construction to become extremely capital intensive, the government says they are resolute about not only increasing the number of units built but also to create easy mortgage facilities for members of the public.

The government is determined to ensure that the housing sector becomes more vibrant but also realized that the housing situation in Lagos is too critical and capital intensive for government to address all alone.

This has made the administration to redefine the role of government in the delivery process by enhancing the role of private sector players. They have therefore re-evaluated the operational environment with the aim of removing bottlenecks and strengthening private sector participation.

In addition to facilitating an enabling environment conducive for business to thrive, the government went further by making equity contributions in terms of providing land for genuine investors.

7.02 Strategies for encouraging PPP

To ensure an enabling environment and provide necessary support for Public Private Partnership (PPP) thereby making Housing Development attractive for the Private Sector, a template for Public Private Partnership was created.

- Government gives land as Equity

- Provides subsidy on Government Fees such as stamp duty and building plan approvals.

- Occasionally subsidizes cost of infrastructures. Provision of Infrastructures is thus treated as social responsibility of Government thereby allowing control over the prices fixed by Developers.

The administration has considered proposals from over 100 Developers out of which 26 proposals have been approved by the governor. The ministry has developed a template for appraising interested private developers as well as facilitating necessary sign-off from relevant ministries and government agencies on behalf of these developers. The template involves the following:

(a) To submit a Proposal for the Housing Project
(b) To prepare all Drawings (Architectural, Structural, Mechanical & Electrical) and Bill of Quantities.
(c) To arrange and provide Finance for the Project.
(d) To construct the Buildings and Infrastructure.
(e) Joint Marketing of the Property.
(f) Management & Maintenance of the Property

The public – private – partnership initiated seems to be taking off as some of the partners have reached advanced stages of work.

Table 7.1: Capital expenditure budget as a percentage of Lagos State Capital expenditure budget from 2000-2008

YEARS	LAGOS STATE ₦	MINISTRY OF HOUSING ₦	MINISTRY OF HOUSING AS PERCENTAGE OF LAGOS STATE.
2000	16, 450, 000, 000.00	667, 000, 000.00	4.05%
2001	16, 773, 700, 000.00	700, 000, 000.00	4.17%
2002	21, 922, 826, 352.00	350, 000, 000.00	1.5%
2003	17, 885, 000, 000.00	200, 000, 000.00	1.1%
2004	24, 315, 000, 000.00	491, 670, 000.00	2.02%
2005	54, 723, 994, 159.00	776, 615, 000.00	1.42%
2006	78, 858, 469, 164.00	3, 474, 584, 000.00	4.41%
2007	114,219, 675, 318, 00	1, 800, 584, 000.00	1.58%

Source: Lagos State Ministry of Economic Planning & Budget

7.03 Progress report on PPP

The Ministry of Housing seems determined more than ever to collaborate and work with genuine investors within and beyond the State to ensure that mass-housing is delivered to the people of Lagos State.

Table 7.2: Status report on projects commenced under public private partnership

S/N	PROJECT	TYPE OF UNITS	NO. OF UNITS	REMARKS
1	Toobi Projects Shasha	3 bedroom (6 in 1) flats	108	Started with 2 blocks
2	Marimpex Imperial Homes, Ikota	Mixed housing	136	38 nos. building roofed
3	Cortex Limited, Ikota	Luxury flats	72	Work in progress about 90% completed
4	First World Communities, (CHOIS) Abijo	2 & 3 bedroom flats	1000	Commenced with 272 units, 68 unit completed. Work in progress on another 16 units
5	Royal Sanderton Technology 29, Aggrey Road, Yaba	4 bedroom town houses	16	Work commenced in 2010
6	Royal Sanderton Tech.Connal Road/Herbert Macauay Street	4 bedroom town houses	40	Foundation work of 10 units already commenced
7	House Height Limited	3 bedrooms flats	296	Work in progress on 4 buildings with 2 at 1st floor slab, 1 at German floor & 1 at foundation

7.04 Mortgage and government housing provision

Provision of Accommodation is naturally capital intensive and affordability implies that for low and medium income earners to be able to buy houses, there must be in place a mortgage finance system. It has been identified that one of the major challenges that impedes home ownership is the inability of the prospective home owner to access mortgage facilities from financial institutions as a result of high interest rates demanded by them.

The state governor was recently interviewed and he gave a status report of where his administration was at the moment. Included in this report was he communicated that no less than 4,219 housing units, built in 12 locations across the State, would be ready for allocation during the period. The housing units, some of which have been completed already, according to Governor Fashola, are located in Sangotedo with 540 units, Ogba with 270 units, Shitta with 36 units, Ilupeju with 60 units, Mushin with 73 units and Agbowa, Phase 1 and 2 with 660 units.

Others which are currently on-going include Ajara housing estate comprising 540 units, Ibeshe housing scheme comprising 720 units, Iponri comprising 144 units, Oyingbo, Phases 1 and 2 comprising about 48 units and 120 units respectively and Badia in Ijora comprising 1,008 units. The government have set guidelines for those who would be eligible, those who pay their taxes, On affordability, the governor explained that winners of the houses would be able to pay over a minimum period of ten years after paying 30 percent as equity of the value of the houses they chose

The model of affordability adopted is that the winners will not be asked to pay at once and would pay over a period of a minimum of ten years upon a deposit of 30 percent equity of the value of the house that is chosen, Householders are not expected to pay more than 30 – 33 percent of income monthly. Their income must march the house that is chosen" (Integrity reporters, 2013).

The challenge faced by the developers is that building materials are not subsidized in any way. The cost of procuring the materials as a developer is similar to others and not advantageous. However it is hoped that the government will initiate policies that would assist reputable developers focusing on the sustainable housing sector to get some benefits from the economies of scale that mass housing production would bring.

The amount of units being built by the government also even though it is a good start and is commendable is not commensurate with the need as we have identified in this study. The numbers of Lagos indigenes

desiring homes is much more than the number of homes available as further confirmed by the number of people that have subscribed to this new scheme being brought forward by the Lagos state government.

Lagos state is the most populated state in Nigeria and suffers from a lack of infrastructure. It is apparent that a lot needs to be addressed in terms of the updating of the decrepit infrastructure prevalent in most areas. The task is huge and the resources to do it would be a challenge alongside the time that would be required to ensure a robust and proper network is put in place to last and be available for the next generation. The next generation would need to overhaul a lot of the seemingly temporary services that have been put in place. There is a need for a total overhaul in places and proper maintenance in others.

The newly introduced mortgage system by Lagos state is a welcome exercise and long overdue however it seems like too little too late if the efforts are not improved to 1) Ensure further units are available as 4,200+ units will not be sufficient. The pace at which houses are being built needs to be further improved to ensure that close to the required numbers are made available. Statistics indicate that over a million units are required by Lagos state. Over a million units will conservatively cost at least 3.5 trillion Naira. This is assuming that all units will be maximum a two bedroom unit, as larger units will obviously be more expensive.

The Ministry of Works and Ministry of Housing have a lot of work to do as due to improper planning and works implementation, the services are inadequate and the infrastructure is inefficient. In terms of drainage in the state; many streets have no drainage and the ones that have need the drainage expanded, cleaned or flushed to ensure proper flow rates. Access to safe water is not adequate and many are reluctant to drink from the taps as it is not regular and not assured that it is being properly treated or filtered. The cleaning of the streets and inner areas of the city has been vastly improved with the advent of LAWMA and its sister agencies. A retinue of workers ply the streets and clean various areas. Unclean areas are opportunities for the ministry of environment staff to invade and fine the occupants and sometimes seal areas that have not paid their waste management levy.

DEVELOPMENT OF NEW / SATELLITE TOWNS

As part of the Administration's effort at decongesting the metropolis, Government has awarded a sand filling contract for the development of a satellite town called IBA NEW TOWN along Isheri-Lasu-Iba Road.

The scheme which covers about 567 Hectares is to provide for a major mixed development use (Residential, Office/Commercial and Industrial).

To further manage the problem of congestion and to redirect development from the metropolis, the Lagos State Government has selected various sites for Housing Development in Badagry, Ibeju-Lekki, Epe and Ikorodu axes.

RENOVATION / UPGRADING OF GOVERNMENTS ESTATES

Another related challenge is the issue of sustenance / maintenance of Housing Estates and the common Infrastructure provided therein.

Long after construction, it was discovered that most of the existing Government Estates have received little or no attention in terms of infrastructure upgrading or renewal.

The Government has promised to be totally committed to uplifting the quality of life of its people, they undertook the task of renewing and improving common facilities on all the Estates, beautifying them and renovating individual buildings. They have renovated about sixteen (16) Nos. Estate across the State.

They are:

- Millennium Housing Estate Gbagada I
- Millennium Housing Estate Oko-Oba Agege
- Millennium Housing Estate Alaagba Agege
- Millennium Housing Estate Amuwo Odofin
- Millennium Housing Estate Shasha
- Millennium Housing Estate Oke – Eletu
- Millennium Housing Estate Ibeshe

- Millennium Housing Estate Lekki Scheme II
- Oba AdeyinkaOyekan Housing Estate Lekki
- Howson Wright Housing Estate Ojota
- Ayangburen Housing Estate Ikorodu
- Abraham Adesanya Housing Estate Ajah
- Amuwo – Odofin Housing Estate
- Mobolaji Johnson Housing Estate
- Micheal Otedola Housing Estate Omole Phase II
- Millennium Housing Estate Ojokoro

These renovation works aside from enhancing the value of the houses, seems to have created healthy environment for the inhabitants. The Ministry has also demonstrated the backward and forward linkages of housing sector activities to the economy by generating employment for locals during the renovation period. One may however ask what happens to these Estates after renovation? To ensure that the renovated common infrastructural facilities on Government Estates are well maintained to slow down the rate at which these improved facilities degenerate, they propose to put in place professional facility managers to continue the maintenance of upgrade facilities in the estates.

PERFECTION OF TITLE DOCUMENTS

In order to ensure that Allottees Properties are secured and also serve as collateral, the government commenced the process of issuance of Deed of Sub-lease to Allottees with a view to having registered titles to their properties.

The government drastically reduced what should have been payable by an applicant for perfection of Title by formally exempting allottees whose allocations were made before January, 2000 from payment of Statutory Stamp Duties and Registration Fees for processing the registration of their Sublease documents.

The programme which was formally launched on 15th April, 2010 had been embraced by some of the Allottees and the first set of Deeds of Sub-lease had been released to the Home Owners.

STATUS REPORT OF THE HOUSING PROJECTS (Source –The Lagos state ministry of economic planning report 2011

ADEBORUWA HOUSING ESTATE IGBOGBO

STATUS, COMPLETED

The scheme which is commonly referred to as the flagship of the Lagos state administration's Housing Delivery Programme commenced in February, 2008. It consists of 256 Units of 1 Bedroom and 2 bedroom Flats and carefully planned as an Independent Human Settlement. (Lagos State Ministry of Housing, 2011) (Lagos State Ministry of Housing, 2011)

Infrastructural facilities within the Estate includes a Primary Health Centre, Police Post, shops, Open Space for recreation and facility manager's office. Also provided are Drains Roads, Electricity as well as a Mini Water Works.

The Estate was commissioned and handed over on February 4, 2010 by the state governor, Mr. Babatunde Raji Fashola SAN. The conception and delivery of Adeboruwa Estate, Igbogbo in less than 18 months seems to underscore the present Administrations commitment to timely delivery of projects.

IGBOGBO HOUSING ESTATE SCHEME II

STATUS; COMPLETED

The Ministry in order to give the citizens more choice embarked on the provision of a Block of 8 Units of 3 Bedroom flat in Igbogbo (since the commissioned Adeboruwa Estate consists of only 1 and 2 bedroom flats)

MILLENNIUM HOUSING SCHEME OKE ELETU

STATUS; COMPLETED

Oke-Eletu Housing Scheme was one of the uncompleted housing Projects inherited by this Administration. The Scheme consists of 152 Blocks of 2 in 1, 2 bedroom bungalows (304 units). In a

bid to ensure that no project in the state is left uncompleted, the Ministry of Housing embarked on the completion of the Housing Scheme.

They undertook the beautification and landscaping of the Estate. Jobs were generated through this completed project.

JUBILEE HOUSING ESTATE ODORAGUNSHI

STATUS: COMPLETED

The Ministry embarked on the completion of the previously uncompleted Jubilee Housing Estate, Odoragunshin which was initiated by the Administration of Sir Michael Otedola. The Scheme is a mixed development consisting of 328 Units of Room and Parlour, 1 Bedroom and 2 Bedroom flats.

In addition to the 328 Units, the Estate has a Primary Health Care Centre, Police Post, Recreational Area and a Facility Manager's Office. It also has standard drains and roads walkways and well landscaped environment.

In addition, there is provision of water and External electrification.

The project is one of the Estates earmarked to jumpstart the Home Ownership and Mortgage Scheme.

MILLENNIUM HOUSING SCHEME, OJOKORO II

STATUS; COMPLETED

Constructed on a total area of 1.487 Hectares, the Scheme which was initiated in October 2008 consists of 80 units of 8 in 1, 3 bedroom flats.

It also has provision for an Estate Manager's office, Security Post, Walkways and well Landscaped Environment. The scheme has been completed and is awaiting commissioning.

MILLENIUM HOUSING SCHEME ILORO (AGEGE)

STATUS; COMPLETED

This scheme which was initiated in September, 2008 consists of 4 blocks of 8 in 1 3 bedroom flats (32 units) is now completed.

Facilities provided include Road, Drainage and Water.

MILLENNIUM HOUSING SCHEME IKEJA GRA

STATUS; 75% PROGRESS

The scheme is one of the housing projects inherited by the present Administration. It was formerly designed to accommodate 60 units of 3 bedroom Maisonettes. It has been redesigned to accommodate 76 units of 4 bedroom Maisonettes and construction works commenced in January, 2009. The building and infrastructural works are progressing steadily and presently about 75% progress has been attained. The Ministry aims at completing the project by the end of the 2nd quarter of 2011.

MILLENNIUM HOUSING SCHEME GBAGADA II

STATUS; 70% PROGRESS

The scheme is also one of the inherited projects and consists of 88 units of 4 bedroom and 4 + 1 bedroom maisonettes. Construction works commenced in May, 2009 and progress attained is about 70%. The Ministry's target is to complete the project by the last quarter of 2011.

As an Administration, Lagos state seems to be trying to recognize that the provision of shelter with infrastructure such as Health Centre, Mini Water Works and Electricity are essentials of social development. They say they have invested in provision of housing not only as a social welfare service but also as a catalyst for sustainable economic development of the state.

They are trying to exploit the role of housing as a poverty reduction asset through the issuance of Titles to Allottees of Government Estates who can then leverage on this to secure funding for other enterprises or secondary homes.

They have envisioned a task of a sustained transformation of Lagos into Africa's model Mega-City hence, putting in place sustainable human settlement development programs that will create a better habitat for all.

While continuing to address the task of Housing Delivery, the administration is exploring various options to address the challenges of the Mortgage Finance Sector in order to make home ownership achievable (Lagos State Ministry of Housing, 2011).

7.05 Public private partnership

Government has developed this delivery strategy that is vital to the success of urban housing projects in Lagos State using the Public Private Partnership initiative. The strategy involves the provision of land by the State Government to Private Developers who are able and are willing to utilise their resources to develop Housing Estates for sale to members of the public. The State Government tries to reduce the delivery cost of such houses by granting rebate to the Developer on the cost of land.

This PPP Programme seems targeted at providing affordable houses for the masses of Lagos State.

The framework for implementation is as follows:

GOVERNMENT

(a) Government to appraise/evaluate proposal for the project.

(b) Government to provide suitable land for the project.

(a) Land to be provided will be at a Premium to be determined subject to location and size.

(b) Government to issue Sub-Lease Agreement/C of O on the land.

(c) Government to hand over the land to the Developer.

(d) Government to give planning approval/permit for the construction of the project.

(e) Government to give necessary support to facilitate the smooth execution and success of the project.

(f) Joint Marketing of the Property.

(g) Government to share profit from the project.

DEVELOPER

(g) To submit a Proposal for the Housing Project

(h) To prepare all Drawings (Architectural, Structural, Mechanical & Electrical) and Bill of Quantities.

(i) To arrange and provide Finance for the Project.

(j) To construct the Buildings and Infrastructure.

(k) Joint Marketing of the Property.

(l) Management & Maintenance of the Property

7.06 Contracts and direct labour

In both procurement methods, the Ministry selects the site, prepares the Layout, does the Architectural design of the House types and goes ahead to develop either by awarding the Contract for the development to competent and tested Building and Civil Engineering Contractors or by arranging the construction of the Houses through direct labour. These two strategies are expected to deliver into the housing stock of Lagos State within the next 24 months, about 2000 Units built in 7 different locations in the State.

The policy of the Lagos State Government in all these housing projects is to develop more houses for the low-income earners who are disadvantaged and may not be able to build their own houses. The policy ratio is 70:20:10, 70 percent for low, 20 for medium and 10 for high (Oluwaluyi, 2008).

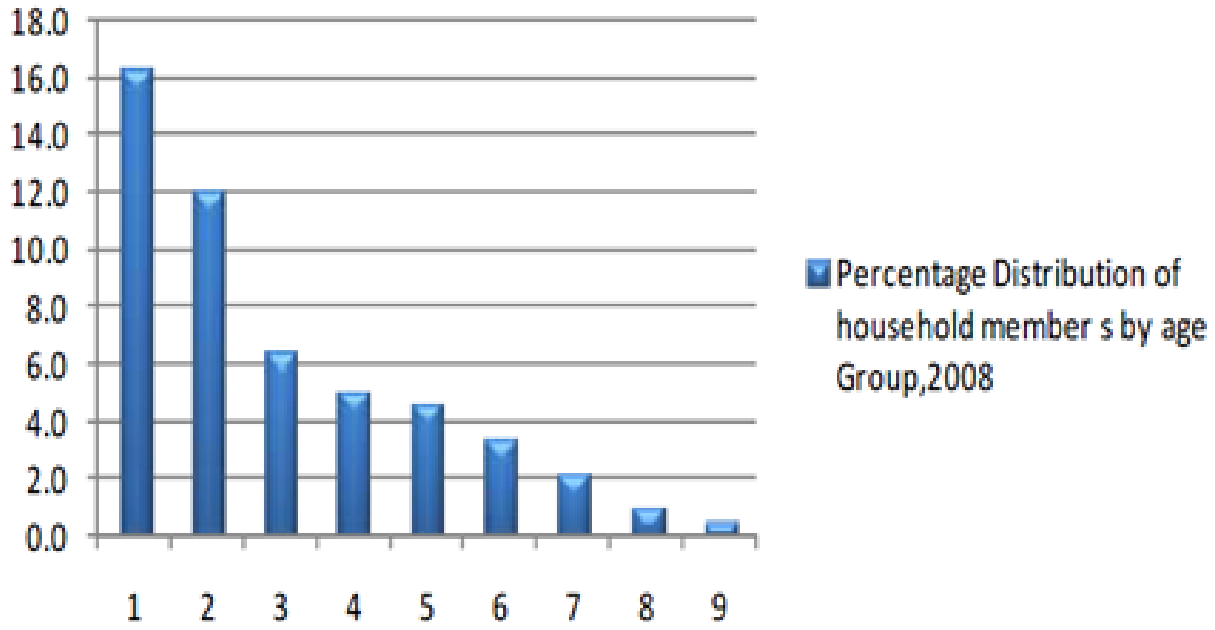


Figure 7.1 Exploration of current practice in sustainable project evaluation

(National Population Commission, 2013)

The current practice adopted by Lagos state and its parastatals is non-organized and there is no vision or strategy involved. Sustainability is not high on the agenda when a project is initially planned. This means there is no thought given to this area from the onset. It also means there is no resource allocated for it, financially or human. Generally internationally projects are evaluated by:

1. Desire of key personnel to engage with the sustainability concept at senior level and/or develop high profile strategies.

2. The needs for performance targets, reporting and comparing achievements with peers (formally or informally).
3. The opportunities from integrating different management systems
4. The need to comply and surpass, EMS and government policy/regulatory requirements.
5. Opportunities for maximizing impacts from existing internal initiatives and best practice
6. The need for innovation and project/service improvement through practical solutions (Kersey, 2004)

(Deakin, et al., 2001) divides assessment methods into two classes: environmental in general and those augmenting into particular forms of life cycle assessments. The environment in general tends to focus on assessments of eco-system integrity.

Those augmenting into particular forms of life cycle assessment in turn tend to focus on assessing how to build the environmental capacity needed to not only qualify the integrity of eco-systems, but evaluate the equity, participation and futurity of the economic, social and institutional structures underlying the city of tomorrow and its cultural heritage. That is, qualify and evaluate if forms of human settlements which develop from the design and construction of buildings are sustainable.

Stepping stones towards having the right tools are obvious in the BEQUESTs with objectives which are:
1. A multi-disciplinary, cross- cultural approach and plan of action for the implementation of sustainability in the context of urban development and regeneration.
2. A directory of environmental assessment methods and a decision matrix to provide guidance to practitioners.
3. A common procurement protocol for the built environment which encompasses the scale of action from individual buildings to the city/urban district.

The Embryonic BEQUEST network, supported by the BEQUEST website, as a means for international and inter-professional communication and collaboration, and eventually, once the project was completed, to function as a self-funding international information exchange in the field of built environment quality evaluation for sustainability (Hamilton, et al., 2009).

For the purpose of this study, the figure below has been adopted and modified from the work of Grey 2012 which was a modification of the work of Maiga 1995 to show linkages of components included in the urban housing delivery system by local authorities, and how the inadequacy of the housing supply has resulted in the urban housing shortage. The study by Maiga (1995) attributed the housing shortage in Dar es Salaam (Tanzania) to urban population growth as the sole cause. It stated that as long as urbanization continues to grow at its present rate of 5 percent and more, the governments and local authorities would not be able to satisfy the housing demand.

And more should be done by other players in urban housing provision since the local authorities alone cannot meet the housing demand, which is basis from which it was adopted and modified.

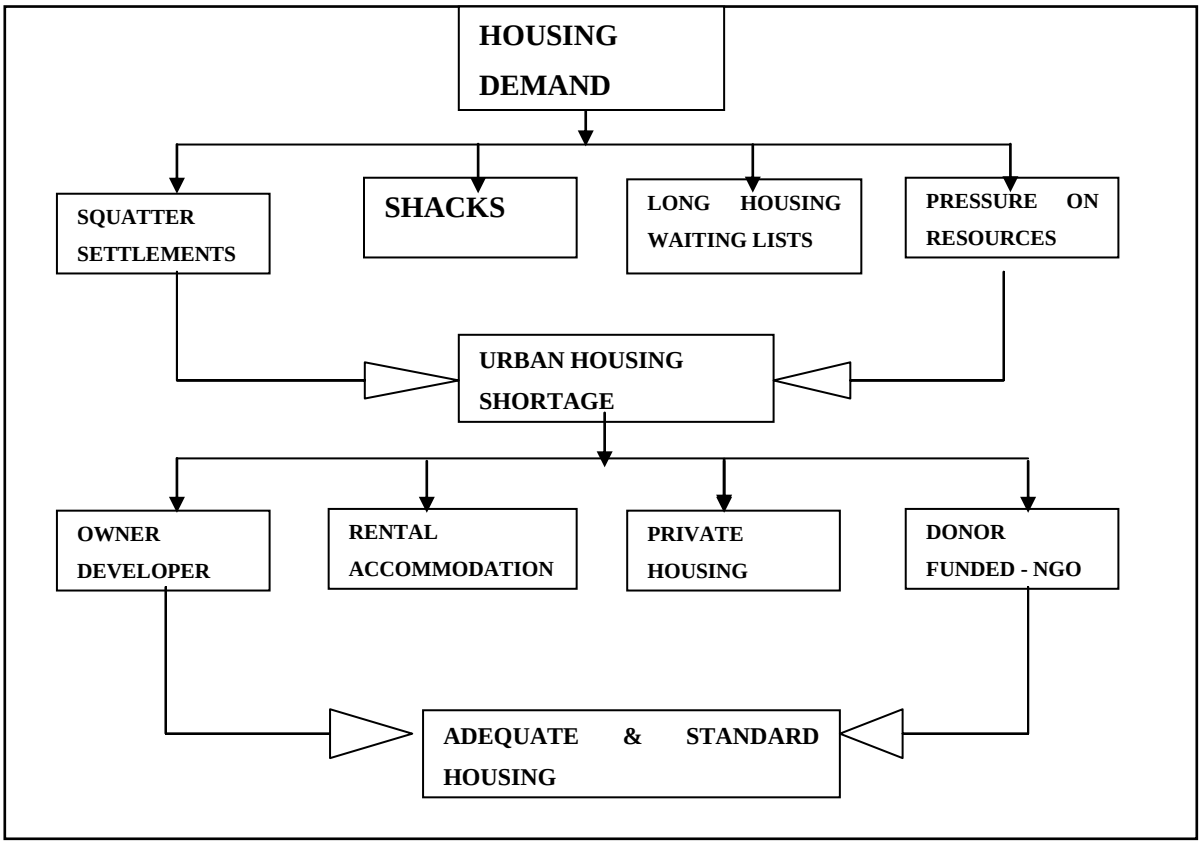


Figure 7.2 : Conceptual Framework for the analysis of the Urban Housing shortage

Adapted from (Grey, 2012)

7.07 Barriers

There are barriers to delivering sustainable housing and means of overcoming them have been presented. However for some barriers it's challenging overcoming them. Government agencies such as Lagos state waste management authority (LAWMA), for example, have a mission to provide professional, efficient and sustainable waste management and disposal services to the generality of Lagosians, public bodies and governments (local and state). Their vision also includes providing adequate waste receptacles as alternative to indiscriminate waste dumping. They also want to ensure effective partnership with the private sector and other stakeholders in waste management and to ensure adequate public enlightenment and education for orientation and decent waste collection and disposal habits. In terms of the actual built infrastructure: The Lagos state physical Planning permit authority. (LASPPPA), who are in charge of permitting development, have a vision that envisions making Lagos state the reference point for harmonious physical development in Nigeria through best practices in physical planning and development. Their mission statement also says to ensure that Lagos state continues to be a centre of excellence through orderly planning and development in the use of land for a sustainable environment. They therefore are responsible for how the development pans out for housing and the sustainable use of it. The land is a limited product that requires a clear policy governing its apportionment to prevent the indiscriminate use of it. Having harmony and sustainability in a built up area to create adequate sustainable housing can sometimes be challenging as the need to build high rise outweighs any other demands; however this is also a viability issue.

7.08 Design Barriers

Local authority is able to ensure that designers and developers assist in the housing provision by ensuring allocation of a proportion of the development to sustainable housing. For example current planning policy in England enables local planning authorities to require housing developments above a certain size to include a proportion of 'sustainable' housing.(Department for communities and local government, 2011) The policy has social objectives (that is, to create 'mixed' communities and reduce the potential for the 'ghettoisation' of sustainable housing) and financial objectives (that is, to shift the cost of providing social housing to the private sector). Although aspects of the policy have been the subject of research the design issues have yet to be fully investigated. Viewed from a development process perspective, the key design question is how layout and design decisions are affected by the developer's perception (or market experience) that the inclusion of affordable units has a detrimental effect on the market-rate housing (Tiesdell, 2004).

Effects of government and stakeholder design decisions process had on the economic, social and environmental characteristics of the case study houses. As researched in the USA in the 1930s, idealistic reformers attempted to create a vast public housing program using modern architectural design. Instead they created a distinctive look that would later stigmatize its occupants. After the passage of the Housing Act of 1949, visionaries attempted to rebuild American cities by placing the poor in high rise buildings, an experiment that was soon deemed a disaster. Today, some scholars believe that placing the poor in environments inhabited by wealthier groups will help to address the problems of poverty (Hoffman, 1996).

In improving housing design, it is important to investigate if proper design is undertaken in disabled housing for low income earners. An estate in the United States of America was assessed for this and key issues were noted. The report documents the project's final phase, a research study to learn whether residents are aware of, use, or benefit from the universal design and accessibility features in the apartments and common areas. The primary emphasis of the report is on the people who live in the building, not the building itself (Anonymous, 2010).

7.09 Cost Barriers

Cost of building including the cost of infrastructure has been identified as a major barrier. There is a lack of infrastructure in areas where the land is cheaper to build and it is therefore a catch 22 situation of finding a balance in segregating land in an area of low land costs. However good infrastructure boosts land prices. The government will have to be involved to subsidize this infrastructural cost as a social benefit to the populace.

Approaching the Lagos housing situation theoretically, without an in-depth understanding of the totality of its component parts and the attendant root causes of the problems facing it, will not offer the best solutions to reengineering the system. There are factors that have hindered the public sector efficiency, effectiveness, empowerment and accountability. The case in Lagos and Nigeria as a whole is peculiar and one may need to grow through the ranks or be within the system to understand the challenges and proffer effective solutions.

7.10 Political barriers

Other barriers are the ones formed by the polity in the establishments. There is widespread resistance and grudging compliance. They are resistance to change as its unfamiliar territory: the human tendency is to want to remain in the same position with familiar methods and policies that sometimes do not achieve the goals and objectives effectively. The state has some relevant policies in place but these are either reluctantly followed or not adhered to at all.

The way the issues are framed and discussed with the public also makes a big difference. Sometimes, a lack of understanding or clarity on the benefits of an offer may turn the people away from the great idea. Under the right circumstances, the words planners use might expand policy options available to local officials. Proper framing may allow some previously unfeasible policies to succeed. (Goetz, 2008) Having the buy-in of the local users is critical to success of any sustainable housing scheme. Enlightening them as to the actual on ground benefits is also important as the day to day benefits is not always apparent. The needs of the occupiers cannot be at variance with the needs interpreted by the policy makers. Having focus groups and users on board the planning and policy train is useful as it gets the policies and its usefulness into the hearts and minds of the community.

Following this research, all the evidence suggests that, given current government priorities, the future output of additional sustainable homes is going to be increasingly dependent on private-sector activity and sites secured through planning-gain mechanisms. If this is so, it will mean that output will depend on a range of interrelated factors including the state of the private-housing market, the flow of land through the planning system, the location of private-sector development, the negotiating ability of planning and housing officials, and competing demands made on planning gain (Crook, et al., 2006).

Learning from this it is therefore important for the Lagos state government to continue its drive with private developers to assist them in having more projects. Assistance would vary from relaxing the stringent land rules to tax concessions and lifting of the ban of importation of some building materials. These would expand the market and invariably lower costs as competition usually does.

Subsequently a number of multi-criteria methods have been developed which promise fully integrated evaluations. (Munda, 1995)(Munda, 2004). However these are still in the research phase and require specialist expert support for application. At the moment most urban professionals remain largely ignorant of the range of assessment methods and tools available to them. A Toolkit assists in answering such

questions posed by users who differ in the experience they possess with regard to various aspects of sustainable urban development (Hamilton, et al., 2009).

The levels of demand for housing within the different tenures are affected by a broad range of factors. Many of the factors affecting demand for particular tenures are related to affordability - the price for particular accommodation being at a level for which the income of the particular household is sufficient. (Harriott, et al., 1998)

7.11 Summary and Key findings

A framework user will be seeking to answer questions, from the basic 'What is sustainable urban development?' to the more complex 'How to assess the sustainability of a proposed project?' This can vary from a complex city plan, through an urban design to the design and construction of an individual building.

The horizon for housing in Lagos at the moment looks bleak as the machinery for production in all its necessary paraphernalia is inadequate. The requirement is phenomenal while the provision is mundane. Previously the government focused on low cost and sustainable housing, now it seems they have given up. Their efforts seem geared to only providing houses affordable by the middle to upper classes. The earning potential for the majority of cadre needing housing is low and hence affordability is nil. The overall level of demand for housing is influenced by a range of factors including demographic issues such as the total numbers in the population, and the age profile of its members. The number of households and the rate at which household formation occurs will also have an impact. Levels of income and the distribution of income throughout the population affect demand, as do the price and availability of accommodation.

The departments are not equipped to handle it appropriately and the outsourced organisations are only there for the huge profit to be made in the different logistics involved. This means all areas have inflated prices that are not tenable as a viable or cost effective production system. The overhaul needs to be immediate and permanent from the various arms to ensure a total new system is implemented. With the right policy and implementation this would be beneficial to all stakeholders concerned. The key decision makers such as the housing director and commissioners awareness of sustainability and its impact and usefulness is not high enough for them to rate it favourably or importantly. This eventually leads to a reluctance to push forward any sustainability agenda in the housing production sectors

The need for performance targets involves setting key performance indicators to enable the individual to be able to benchmark their performance with the ultimate goal or objective of the exercise. It allows progress to be measured and properly evaluated against the set targets.

The systems used worldwide in construction management enable risks to be limited, allow costs to be calculated more accurately ensuring that quality is also controlled. All the new management systems promote efficient working. It is important to have the right policies and regulations in place to ensure that everyone is focusing on the right and similar objectives. It also ensures adherence to government compliance is kept. Maximizing impact translates from an efficient system adopted in an establishment with order and proper workings of the establishment.

Innovation is key in the present day we are in as better and cost effective building materials are being manufactured to alleviate the issues faced in the modern day construction and housing sectors.
The materials aid speed of construction and translate to reduced costs. The procurement methods adopted for the housing construction needs to be modified to suit the local terrain. Innovative use of local skills will be crucial in overcoming social barriers for example. In an area with a lot of grass root involvement it would be better to get the local buy in from the councillors, chiefs and possibly area warlords. The labour especially unskilled and possibly semi/skilled labour should be local. This reduces local interference and aids conflict resolution.
This qualitative assessment will help in refining the framework by utilising the information analysed into an effective structure that would eventually be the framework.

CHAPTER 8 - FRAMEWORK DEVELOPMENT

8.00 Introduction

This framework development will help to assess and respond to owner occupier problems and emerging issues, It will meet government's design and technology compliance obligations and help developers and house builders convert business risk to opportunity.

8.01 Purpose of the framework

The framework primarily will be of use for:

- Inhabitants i.e. owner occupiers or tenants
- Developers to evaluate and plan their projects
- Planners, stakeholders, decision makers and government officials
- Individuals looking to purchase properties

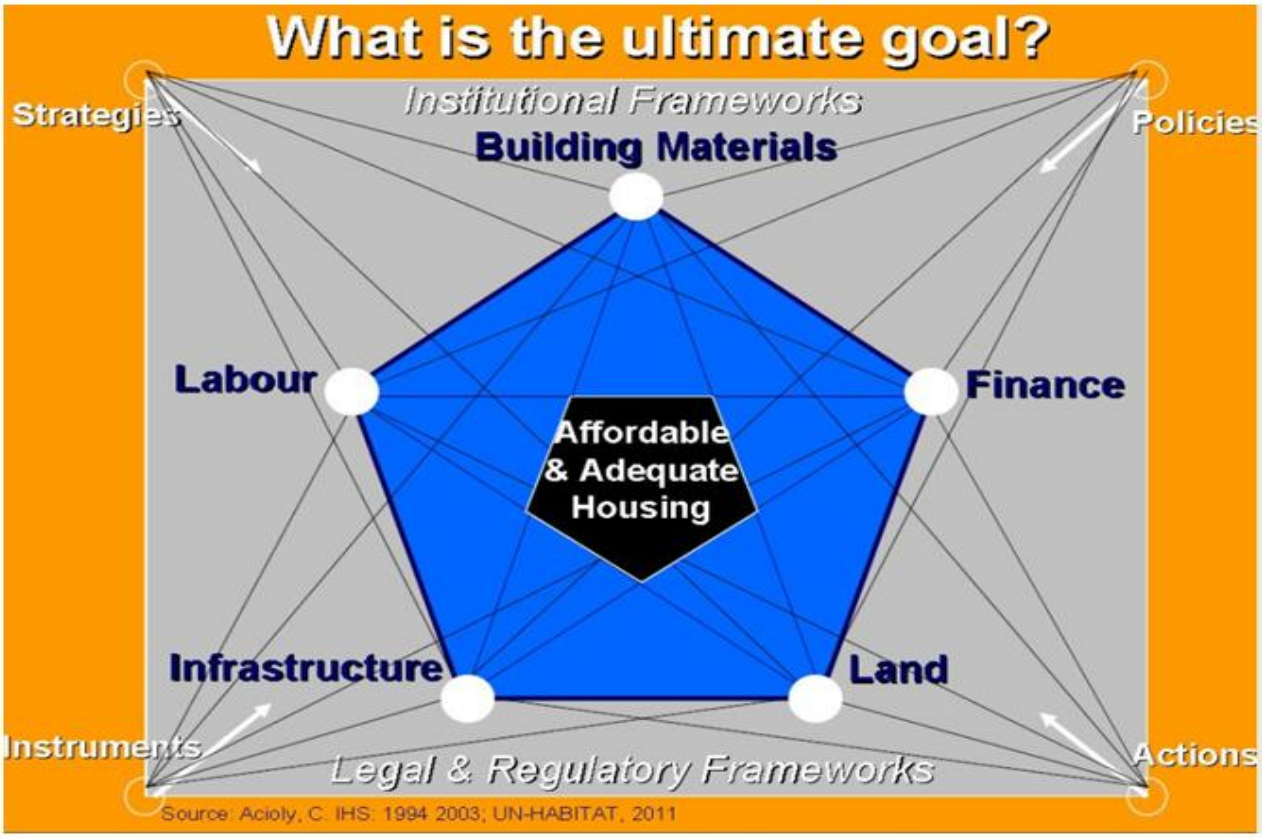


Figure 8.1: Institutional Frameworks

(Acioly, 2011)

8.02 Scope of the framework

By design the framework is both descriptive and prescriptive. It describes the underlying structure of environmental decision making, but it is also intended to enlighten decision makers about both what they are doing (or not doing) and how they could improve their decision processes. (Tonn, et al., 2000). The framework presents all the generic descriptors common to all housing developers. Although it is based on the current housing environment within Lagos, it also attempts to anticipate how this may change over the next ten years through to 2024.It is expected that the framework may need to evolve in response to changes in the construction environment and that relevant firms and groups may wish to translate it into more design and construction specific language and context as appropriate.

Although focused on housing activities, the framework also recognises other activities that may or may not be undertaken by developers or practitioners within the construction sector beyond housing development. The framework acknowledges that all stakeholders will be at different positions in terms of their current developments, activities and aspirations so may be selective in how and why they use it.

The framework addresses different stages of being a home occupier, housing developer or government body including:

1. Type, size and cost of housing units
2. Land use act impact
3. Financial encumbrances
4. Housing materials availability
5. Construction skills know how and transference
6. Sustainability factor, input and future environmental policies

The map of the research process and findings in Figure 8.2 below highlights the process and methods used in reaching the framework destination in this research work. It commences by identifying the research area and shows it's an iterative process in the literature review which sheds light on many grey areas. The methods of quantitative and qualitative adopted enabled a thorough study to be used and the philosophical theory helped to buttress the points made. Main issues of sustainability, environment, technology, research in building materials, financial cost models were discussed. The right sampling strategy/size and response rate was important and utilised.
The interviews, case studies and focus group discussions helped to develop the framework while highlighting the barriers and assisting in the validation process leading to the conclusions and recommendations. This map shows that this study is theoretically and geographically significant in many respects and would hopefully contribute to the process of developing a framework for providing sustainably designed homes that will more readily reflect the occupant's requirements.

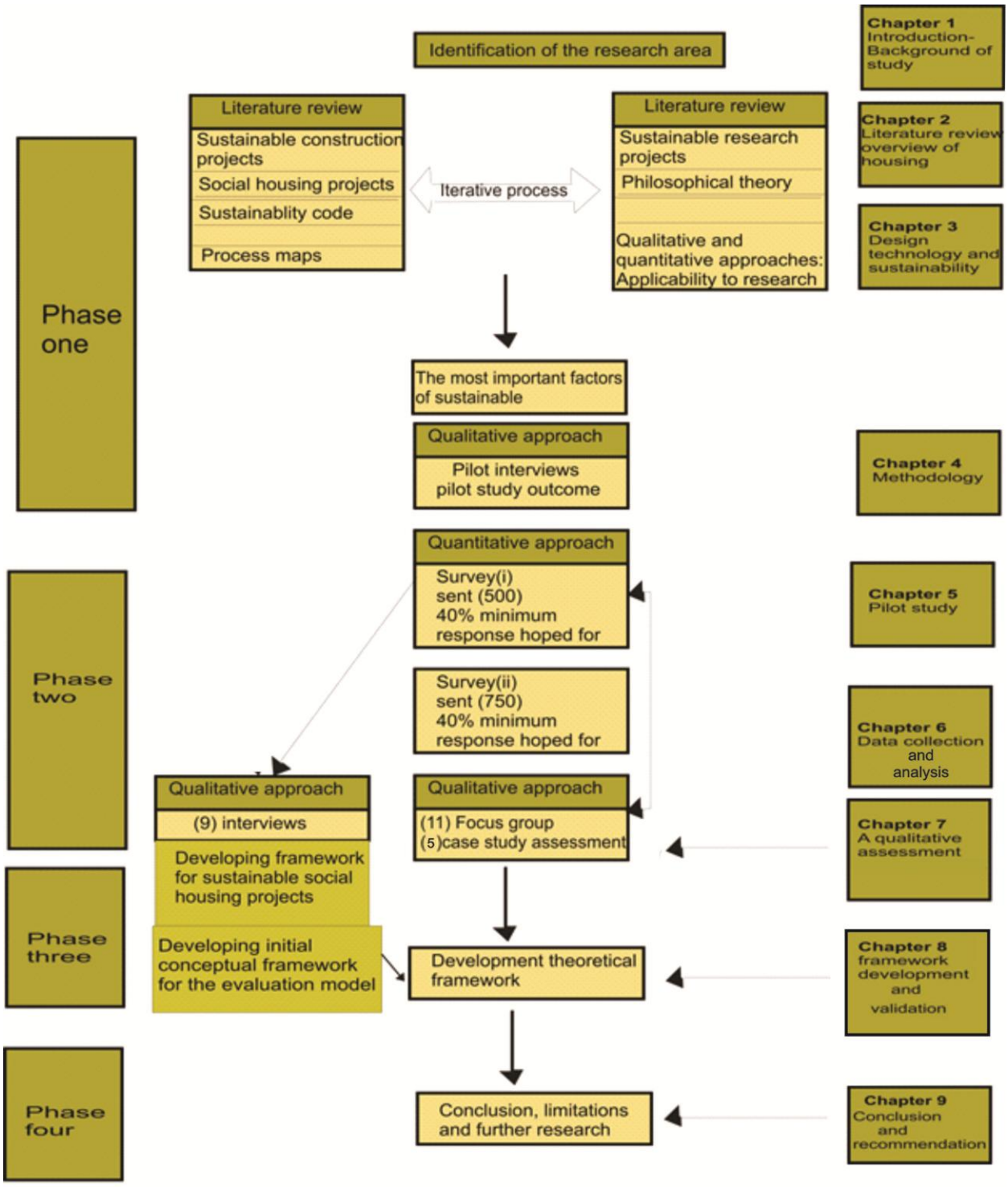


Figure 8.2: Map of the research process and findings

Adapted from (Beadle, 2008)

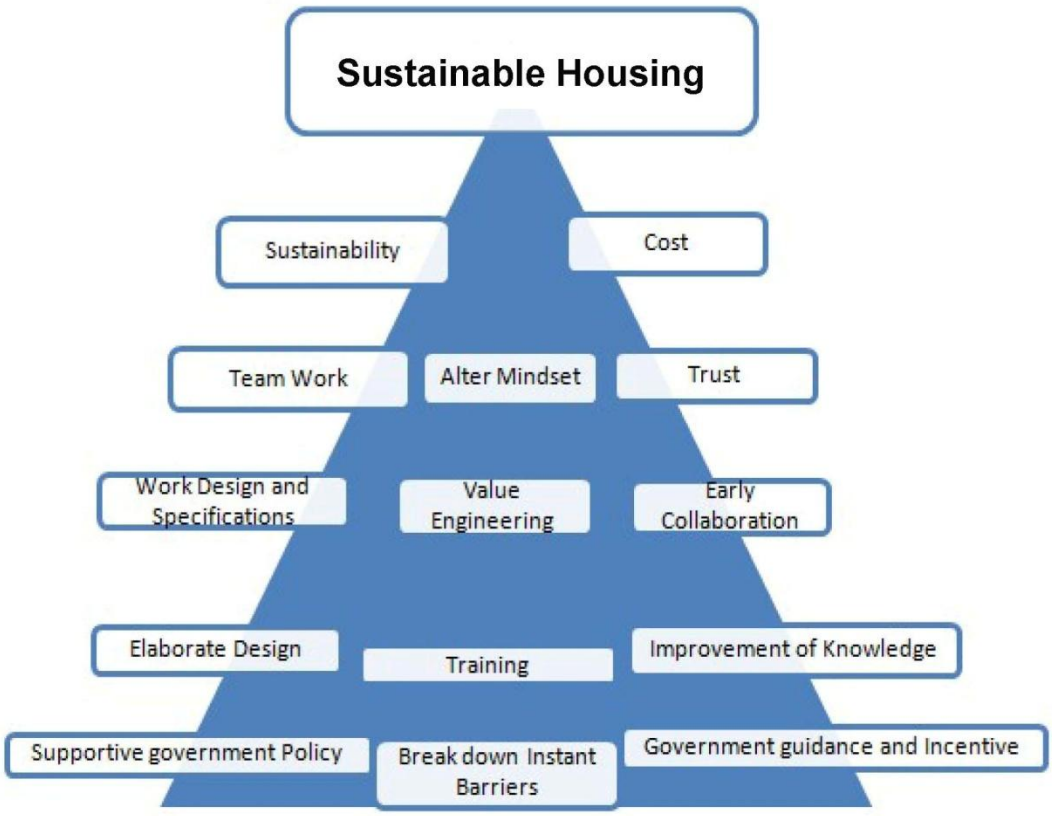


Figure 8.3: Initial Framework for Sustainable Housing

8.03 Development framework

This development framework is designed for the stakeholders to assist in making the right decisions after following the decision making pyramid. This pyramid in Figure 8.3 above takes the user through the various options that need to be surmounted which then directs them to making the right choices to achieve sustainable housing. Other benefits include:

- To provide easy to understand processes and routes for achieving sustainable housing in developments new or existing.
- To provide guidance for stakeholders e.g. government officials, affiliates, inhabitants and stakeholders looking to scale the hoops associated with construction in the state.

Housing providers and Local councils should use the development framework to identify what sort of organisation, in terms of the sustainability, they are and, on that basis, what specific options they have. There is no 'Do Nothing' option in reality.

This development framework is a distillation of various information gathered from research and data acquisition also received from local council publications, housing organisation providers; ministry of housing officials, LSDPC officials, built environment professionals, present occupiers, and others with a vested interest in the sustainability of social housing.

The various variables are geared around real life settings and events. These variables are caused by the environment created by the many characteristics surrounding housing provision in the state. The state has peculiar characteristics that are dictated by the factors prevailing in the construction industry of the state.

These variables gathered from the research study include the lack of mortgage, lack of cheap finance, the lack of local building materials, the lack of skilled artisans, the land use act, the lack of monitoring of buildings on site, the lack of enough design and building professionals, the lack of pride in the building profession, the poor skills transfer, the high costs of land, the prohibitive planning process and the lack of community cohesion.

It's hoped that various permutations will be exhausted to ensure that the outcome will be commensurate with what occurs in developed countries but allowing for the local factors which can be a positive and not a negative.

For example a prospective developer will input factors such as the need to do a development of 10 acres in a certain area. Questions will be asked such as: what does he have in mind - low cost, medium or high cost. The right amount of land needs to be identified and the location is vital to concluding the cost of it in Lagos state. If due to social and environmental reasons the state feels it would allocate a more expensive piece of real estate for sustainable housing in a particular area, exceptions will be made. Normally the sustainable housing is not so near the central business district. This practice needs to be looked at by the town planners and urban designers to ensure that the right mix of housing is provided in areas and there are sufficient planned crossovers to prevent disruptions and a ghetto outcome.

Many of the Malaise that we notice in the public domain is as a result of poor environments for bringing up families, poor facilities and areas to nurture. Families are scattered or living together in very cramped and unhealthy inner city environment. Such families have a lower mortality rate and also disease transfer is rampant due to poor economic facilities.

This development framework was assessed and tested by a group of seasoned professionals in the design and construction field having expertise in housing. This was to gauge the effectiveness of this development framework and the benefits and non-benefits to its users. A beta testing process was also adopted to ensure that it can be updated to encompass all the negative and positive comments. It is important to establish the importance of a rigorous performance testing. This allows users and providers to always have their comments and opinions used as a guiding factor in the provision of this housing development. The housing has to be fit for purpose and serve the majority of the population or at least be available for them.

The indicators in the framework will be used as a benchmark and a pointer to the direction in which this exercise should be focusing. A review of the processes in place has been completed and it is been identified that there is a gap for improvement. It has also been identified that the research and development arm of the state government is lagging behind. In the researcher's interview with key members of the state executive body it was cogent to see that the address of the provision needs more government support financially and sustainability wise. There is a knowledge gap in the industry as well as within the government establishment. Once this issue has been addressed then a better understanding of what is and could be will be identified.

The framework development will address directly the points raised above. This framework will serve a wide array of users. The guidance offered in the Development framework will be continually reviewed and developed. Those developing new processes or documents within their organisations should check Lagos State website for the latest guidance and examples.

The revised framework Figure 8.4 below for sustainable housing is developed from the initial framework which looks at the various variables that would lead to sustainable housing. It has distilled all and highlights the relevant variables.

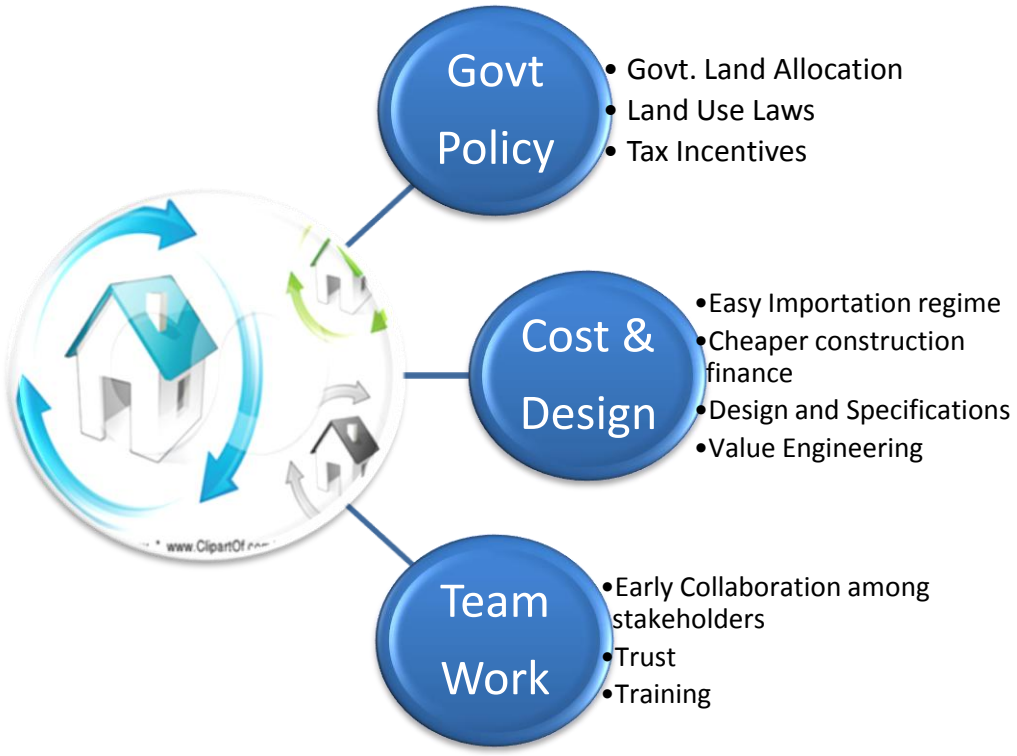


Figure 8.4: Revised Framework for Sustainable Housing

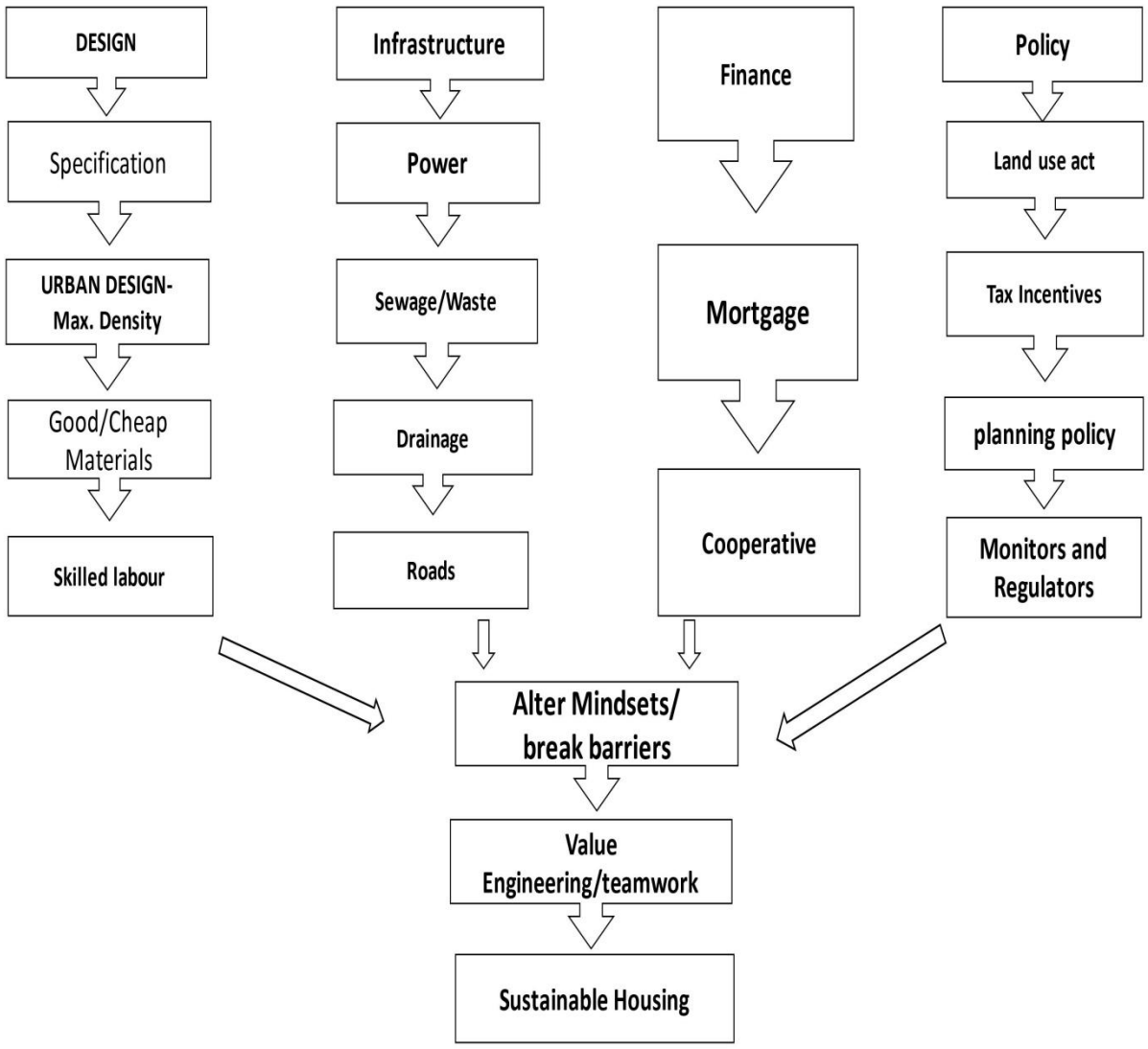


Figure 8.5: Process Flowchart of Delivery Framework for Sustainable Housing

The process flow chart Figure 8.5 above is geared towards ensuring a successful outcome in the drive for sustainable housing. What inputs are needed to get the right output? These are the questions asked. The flowchart is result driven and focuses on design, infrastructure, finance and policy. Monitoring, altering mindsets and teamwork seem to be strong factors that ensure sustainable housing.

8.04 Focus Group

Focus group discussion (FGD) is defined as a collective conversation or group interview (Denzin & Lincoln, 1994). The group size varies from small (6persons) to large (12 persons) and may or may not be guided by a facilitator. FGD is used to obtain in depth information relating to concepts, perceptions and practices from group members (Morgan, 1998). This is not a question and answer time, but rather an opportunity to gain insight on the subject from the perspective of experts, practitioners and stakeholders in a purely interactive session.

Several researchers have used FGD successfully for the formulation of research questions, gaining greater insight on the subject and resolving unexpected issues encountered by questionnaire and interview methodologies ((Balch & Mertens, 1999); (Mbeng, 2009); (Refsgaard & Magnusen, 2009).

8.05 Data collection: focus group discussion

The earlier qualitative and quantitative methods: interviews, questionnaire survey provided critical ingredients for the proper understanding of present sustainable housing delivery practices in the city.

8.06 Focus Group Design

Venue: Tenfold Design office conference room at Unit 3, No 13 Acacia drive, Osborne Phase 2, Ikoyi, Lagos, Nigeria

Participant recruitment

Participants in the group discussions were randomly drawn from a short list of stakeholders in the city.
The process for the recruitment of participants involved sending emails and telephone conversations. The total number of invitations sent were 15 and 11 attended. For the purpose of this discussion, the researcher acted as the facilitator and FGD was for a period of two hours.

The main factors considered while inviting participants were:

1. Knowledge of the subject
2. Participation in the questionnaire survey
3. Spread, both in terms of geographical and sectorial representation (Anon., n.d.) (Lade, 2013)

Participants attended:

1. Mr. A - Structural Engineer and project manager
2. Ms. B – Architect
3. Ms. C – Solicitor and government adviser
4. Mrs. D – Interior Architect/contractor and home owner
5. Mr. E – Structural Engineer
6. Ms. F – Accountant and property developer
7. Mr. G – Development advisor to various state governments
8. Ms. H –Business service delivery manager and home owner
9. Ms. I – Systems Analyst and home owner
10. Ms. J – Interior Designer
11. Mr. K – property agent and home owner

8.07 The objectives of the FGD were:

- To validate the framework developed in this research process.
- To provide a platform for the participants to fully engage with the framework.
  To investigate:
- If the framework is useful to the stakeholders.
- If the framework is easily useable
- If the framework has flaws and what they are
- If the framework can be improved and how so
- To strengthen evidence and findings that led to the framework development
- To prescribe other options for the framework to help in achieving sustainable housing delivery in the city on available evidence.

The FGD provided a relaxed atmosphere that encouraged participants to freely air their views on the subject. A full group discussion was adopted. Following a general introduction, a full group discussion was conducted with the facilitator. The discussions were recorded by audio and video means for subject transcription. The FGD was facilitated by the researcher. The information gathered from the transcript was used to determine the position of the stakeholders. This was with a view to proscribing a final framework with strategies and policy options adapting global best practices that will suit local conditions.

8.08 Framework Analysis by focus group

The initial framework pyramid (Figure 8.3) was analysed and the key attributes shown was agreed upon by all as being the bedrock to a good framework. The following points were raised:

It was found very useful as a tool that the three different groups can key into and have as a guide to streamline direction and also coordinate strategy.

Groups covered: The three groups identified are the householders the developers and the government department. It was felt that if the framework focused on those groups it would cover the majority of people affected by sustainable housing delivery.

The focus group participants (FGP) found the framework easily useable.

The flaws identified by the FGP are:

1.) Number of attributes indicated on the framework could be a bit confusing to arrange in a coordinated manner.
2.) The group felt for the framework to be fully useful it needed to be broader based and more encompassing. However they also admitted as above that it could get too confusing at the same time if too wide.

Improvements suggested were:

1. That a flow chart type of format would be easier to read and navigate.
2. It was felt that the initial summary and focus of government policy, cost, design and teamwork was good. However the inclusion of householder and developer was essential as they were the main vehicles for delivery of the housing and also the recipient of the housing units.
3. To rearrange some of the attributes in a table like chart as noted above.
4. To colour code the different streams in order to show cohesiveness.
5. Highlighting the training was important for all parties especially the developers and the government officials. It was felt unanimously that the quality of the housing was dictated very much by the skills of the tradesmen and artisans involved on site as well as the monitoring given by the regulating government officials.
6. In particular the attribute “breaking down of instant barriers” was not seen as a permanent issue and would be overcome once the system was seen as efficient.
7. It was felt the design did not need to be elaborate but mainly efficient and professional.

The Focus group addressed the summaries of the framework individually and discussed other barriers. Everyone participated actively in the focus group discussion and the attributes and variables in the framework were discussed.

The solicitor in the group says policy and lack of political will was a key problem; the land use act was also another stumbling block to be rectified. The Financier, home owner and developers in the group reiterated affordability and lack of mortgage finance. The architect and structural engineers in the group highlighted the sustainability issues and the need for good design and specification ensuring use of good local building materials that would be environmentally friendly.

The analysis of the focus group information took a while as the data underwent an analytical process which involves a number of distinct though highly interconnected stages'. The five key stages are: familiarization; identifying a thematic framework; indexing; charting; mapping and interpretation. (Rabiee, 2004) The other distinctive aspect of the analysis is that although it uses a thematic approach, it allows themes to develop both from the research questions and from the narratives of research participants (Ritchie & Spencer, 1994). (Krueger, 1994) suggests that a helpful way of thinking about this role is to consider a continuum of analysis ranging from the mere accumulation of raw data to the interpretation of data: the analysis continuum: raw data; descriptive statements; interpretation.

8.09 Sustainability Framework validation

This sustainability framework validation shown below (Figure 8.6) is to ensure that all the parameters are considered within the housing development setting. All the attributes that could affect a development have been correlated and arranged into the 4 sustainability determinants namely: ecology, economy, political and cultural. These determinants are important in the housing delivery environment of Lagos and ensuring an outcome that will aid sustainability. The interrelationships governing the determinants are shown and the cyclical interconnectivity is also displayed. Business dictionary defines Corporate social responsibility (CSR) as "A company's sense of responsibility towards the community and environment (both ecological and social) in which it operates.

Corporate social responsibility is an aspect that resonates with corporate establishments in recent times. Organisations are looking to show their civic responsibility and have a desire to contribute more effectively to the development of the community. Corporate social responsibility has to do with an organization going out of his way to initiate actions that will impact positively on its host community, its environment and the people generally. It can be seen as a way of acknowledging the fact that some

business fall outs have adverse effects on the citizens and society and making efforts to ensure that such negative impact are corrected (Adeyanju, 2012).

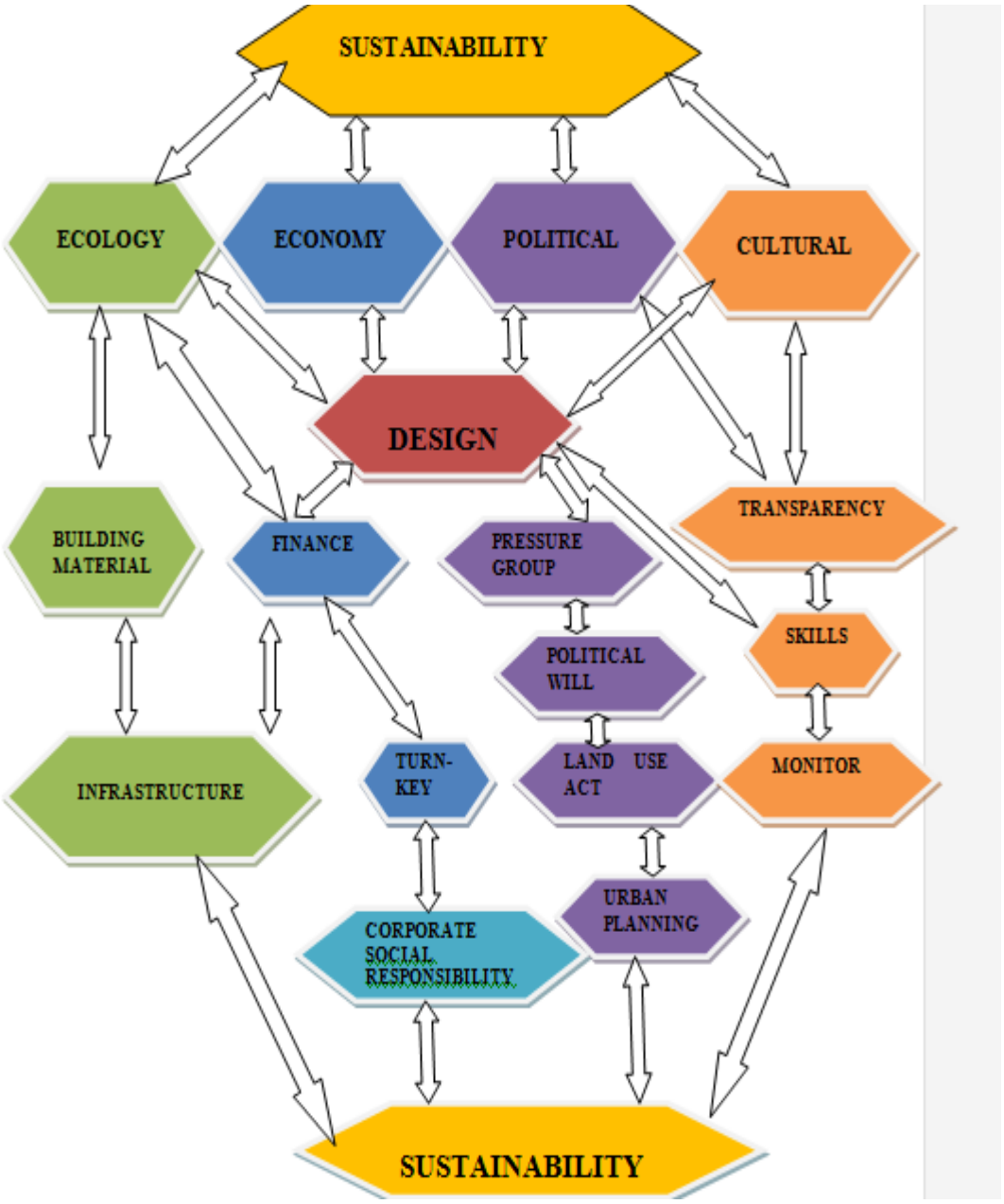


Figure 8.6: Sustainability Framework Validation

8.10 Focus group workshop analysis outcomes

1. **Design** – The design of the housing needs to factor in the social, environmental, financial implications. The building style adopted in Lagos needs to suit the terrain, weather and the inhabitants lifestyle. Densities of sites need to be increased. Highrise buildings need to be built to reduce the use of land for cheaper. More construction firms are required to break the monopoly created by lack of many firms that can build quickly, highly and properly.
2. **Political will** – The government needs to be focused, non-political, truthful and determined to make the housing delivery work for all parties involved
3. **Land use Act** – This has been a bottleneck for many years, this act needs to be revised to adapt to present day requirements for investments in land and property. It's a restrainer on investor's ability and expansion of real estate in Lagos state.
4. **Turnkey developers** – Experienced one stop shop developer's in house building from home and abroad should be encouraged to set up shop and roll out the housing units in large numbers in a systematic way that would benefit all. They can employ labour, train them and bring savings in the large economies of scale.
5. **Proper Skilled Labour** – Good labour as noted above are few. Creation of training centers and vocational/technical schools as the government has started is essential. The government can give graduates incentives to stay by providing accommodation for them and of course jobs too. With good accommodation, proper training and certification and a steady wage it would be foolhardy for them to move onto uncharted waters.
6. **Building Materials** – This is due to a lack of manufacturing and also proper research and development in that area. The high costs are prohibitive. Conclusion – Government should drive research and development by supporting the schools that are developing new products in the form of finance, scholarships etc. Technology to improve the materials and its supply should be financed.
7. **Infrastructure** – Power is crucial to any countries development as manufacturing industries can't function competitively without power. Good roads for quick transportation, Drainage for easy run-off and a healthy environment, Water to cook, clean and bathe enabling a good clean environment for all.
8. **Finance and Mortgage** – The financial instruments surrounding housing provision need overhauling as the cost of money is too high. Both the developers and the purchasers find it difficult as interest rates are very high.

9. **Key staff priority** – The key staff who work in every town like the policemen, nurses firemen, doctors need to be provided housing as a priority. A shared ownership scheme could be adopted, with various models to cater for all family sizes and groups of people.
10. **Urban Planning** – As noted above the planning of the city needs to reflect the need for a higher density at the same time it would show that we can have high density yet low crime rates and good services. Areas like the army barracks which occupy large portions of land in town can be moved to the outskirts and these areas redeveloped to create larger numbers of housing units.
11. **Transparency** – This is required amongst all the stakeholders to ensure that there is unity amongst the troops. Ghost-workers amongst the government workers need to be eradicated, so that the few housing available will go to the needy and deserving people. A biometric system for those on the database can be adopted to ensure this.
12. **Monitoring** – Without proper monitoring and overseeing many of the projects never get completed or even commenced. It is essential to have a check and balance system to ensure proper delivery of the projects. A building standard needs to be met albeit the National building code requirements.
13. **Encourage private sectors with incentives** – In all countries undertaking social housing or housing on a mass scale for the citizens, there are incentives given to the willing participants to encourage continuous involvement. Also a local contents policy needs to be adopted to reduce foreign intervention in areas where local artisans can get involved.
14. **Corporate organizations mandatory provision for staff** – This will alleviate the burden of the state as a group of people would have been catered for hence reducing the demand on the public infrastructure.
15. **Developer's community service provision** – This is as a part of their corporate social responsibility and will be in the forms of provision of a much needed facility like a primary school, a sports/football or playground, a library etc.
16. **Pressure groups and lobbyists** to rally the government and ensure they are attentive to the needs of the populace at all times.

8.11 Final Sustainability Framework Model

The Final frame work model below is a result of the analysis and focus group summation of all the previous frameworks. It is designed to be simple and easy to navigate by all major stakeholders.
The three main stakeholders all have responsibilities which if they evade individually or collectively would have an impact on the outcome of the housing delivery. It's therefore essential for an effective sustainable housing delivery to have synergy amongst the parties.

The initial design has to factor in the urban aspect bearing in mind the social, environmental and financial implications prevalent in the local area. The design beneficiaries are all the stakeholders most especially the occupiers who enjoy a home with good ambience and infrastructure at a reasonable cost.

In the present political dispensation, the political will to ensure a good outcome needs to be paramount. As one of the major housing development costs drivers is the infrastructure provision which is primarily a government provision. The power improvements, the road construction with proper sewers and drainage all are major costs which if borne by the government will reduce the overall building costs. Therefore there is a need for focus, truth and determination on the part of the key government departments and their staff having a willingness to make the development work. The land use act which has crippled investment in the property sector if revised appropriately will enable different investors to feel confident to participate.

Turnkey developers are encouraged to participate as they can provide the housing units in large numbers and in a systematic way using the latest building materials, design and technology that would benefit all. These experienced housing developers usually work to a high building standard and ensure that all their artisans and subcontractors operate to the same high yardstick that they use.

Financial instruments that would enable cheaper funds into the housing market is the dream of all the stakeholders. These would allow a wider pool of buyers with mortgages and also enable the developers to build for cheaper as the building funds will not be too exorbitant. The tax and duty incentives given will also allow importation and specification of a wide range of building materials allowing stronger competition amongst manufacturers.

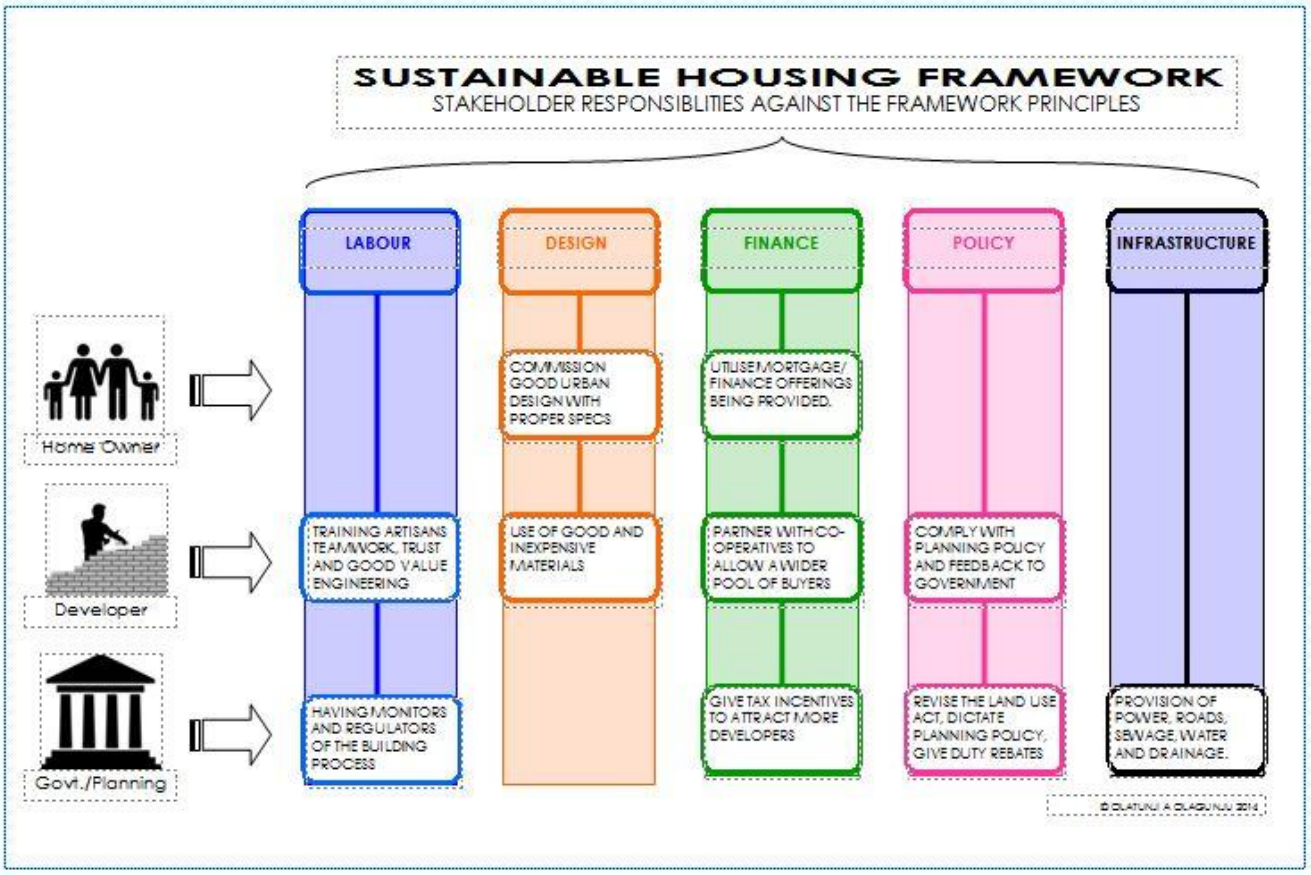


Figure 8.7: Final Sustainability Framework Model

8.12 Summary

This chapter has focused on the various stages of the framework development and how we arrived at the final model. The various attributes and determinants have been correlated into an easily track able diagrammatic format to enable stakeholders identify the impact of the different issues. The other parts of the chapter presented the various types of research methods and the features that determined the choice of the particular method selected. Quantitative and qualitative research methods were explored in order to establish the relevance of each of them to this research. Quantitative research methods was adopted given the features of the data that were required as part of the input into the decision framework being developed in this research. Sample survey was adopted instead of experimental research, because there was no need to control any variables measured in the research. Furthermore, focus group discussion was adopted to strengthen evidence and findings from the entire work and validate the developed framework.

The questionnaire development, sampling frame and responses to the questionnaire survey have been discussed. The response rate of 96.3% is above the range of response rates for questionnaires that have

been reported in UK construction industry research. Moreover the profiles of the respondent suggests that 48.4% of respondents were home owners. These are expected to be decision makers that can be described as stakeholders who will implement the output of the decision support model when applied to decision-making on the selection of sustainable housing delivery systems.

8.13 Implications of findings on the framework

The implications of findings on the framework is such that following the desk top literature review conducted and the field work involving interviews, questionnaire survey, data analysis and focus group discussion we have come to the conclusion that the design of the housing units is a key requirement to achieving a cost effective scheme that would be favoured by a majority of the occupiers. The efficient design of the spaces would enhance the value and limit redundant spatial design. This would also ensure that there is value added without wastage. The contribution to knowledge going forward is the final framework which is a result of the variables and findings.

CHAPTER 9: CONTRIBUTION TO KNOWLEDGE, CONCLUSIONS AND RECOMMENDATIONS.

9.00 Introduction

This chapter concludes the present thesis summarizing the extent to which this research has achieved its objectives and suggesting applications for the research. Questions for policy to address to enable the delivery of sustainable housing are presented. This is followed by a brief overview of the limitations of the research and the final section suggests areas for future research to enable the development of sustainable housing. As this research progressed, suitable results and procedures that would assist the government and policy makers in a development framework implementation to make sure sustainable build in Lagos, Nigeria appreciated by the occupiers have emerged.

9.01 Contribution to Knowledge

One original contribution to knowledge made by this research is a development framework which helps to assess and respond to owner occupier problems and emerging issues, and could help developers and house builders convert business risk to opportunity.

This development framework serves to aid the users namely government planners and decision makers, house builders and home owners to make decisions with regards to housing delivery. It introduces the environmental sustainability (ES) concept and approach, it also provides users with the necessary information and tools similar to an environmental impact assessment for the provision of sustainable housing in an area. This can be defined as something focused around conscious, repeatable methods for gathering raw research from multiple sources in specific contexts and transforming it into real insight & information (Beecher, 2009).

This is a systematic analysis of the prevailing surrounding situation to come to the most appropriate technological sustainable design for any proposed project. The development framework will also aim to look at design, technology and environmental sustainability of the materials as well as other factors surrounding creating housing in a sustainable way. Energy & CO2 emissions is one of the major issues for sustainability and good designs can be created for the varied Nigerian climate by combining energy

efficient construction with passive heating and cooling to achieve a sustainable society. Future buildings must be energy efficient, and energy conservation measures must be adopted in existing buildings.
The adaptation to natural surroundings and the people in the area is also key to forming a seamless relationship with all parties involved in the development.

The framework outlined here is a user-centred design development framework. The key criteria are for it to be user-friendly and easily understandable by home owners, developers and government policy officials alike. There is a challenge for the urban poor and it is not only in Lagos that this occurs but in every fast-growing city. Rural to urban migration creates an unprecedented wave of demand for shelter under which an unprepared metropolis would buckle. The main objective of this research was to highlight a problem and elicit solutions from this problems that would be sustainable and realistic judging by the environment and social parameters that surround us. A lot of the estates built by the government predominantly for the city inhabitants seem to have fallen into a state of disrepair. The overpopulation is more apparent in the room densities of some parts of town without any properly constructed estates like Makoko which is as high as six persons per room. (Okoh, 2009)While some parts of Lagos remain well-planned, there are some others where the effects of slum and blight pose a serious threat to the co-existence of the metropolis especially in preparation of Lagos as a megacity. Such areas are Ijora, Badiya, Amukoko, among others. (Alabi, 2009) One reason that is often given for the speedy dilapidation of the government schemes in existence is that the architectural design of the estates is not necessarily congruent with the social and cultural whims of the inhabitants (Uzuegbunam, 2012).

Majority of the population have this urgent need to acquire a property that belongs to them and it also serves as abode for shelter and security. It is usually a worthwhile investment that can yield a flow of income if properly managed over time. It is also seen as a source of prestige and status. It can act as a good security for loans and can therefore be inherited. Finally it can contribute to physical development and stimulate the economic growth of the nation. Almost every Nigerian has grown up surrounded by cement block manufacturers parading their products in their vicinity and understanding the concept of purchasing a plot of land. This land is usually bought at great cost and left fallow for a while until the individual is able to either commence and fence the property or continue construction works on it.

It is not unusual for a construction project to commence and take up to ten years to complete. It is usually as the self-builder has funds that he progresses the works and building materials are often left idle on the site for months on end awaiting the next phase of development (Olagunju, et al., 2011).

It has been argued that the government is best to facilitate the provision of housing and be a direct participant. However, this writer earlier postulated in the previous chapters that it would be foolhardy and inconsiderate for the government of Lagos to adopt that approach as the problem is so dire and the need so high that no private developer can cope. Also it is important to note that the financial wherewithal is not available with the private developers and would need a government-backed intervention fund to provide the number of housing that would accommodate the Lagos mega city dwellers. The best approach, as has been achieved in other developed countries in the past, is to have a mixed approach where the government focuses on the main bulk of the infrastructure provision and also act as the initial driver for the housing units. This galvanises the private real estate developers as they are usually cautious in a developing world economy. The amount of resource needed for infrastructure and large quantities of housing units is usually found with public establishments or institutions like the pension and insurance companies (Halliday, 2008).

9.02 Conclusion

Going by the results of this study it has become apparent that the local inhabitants are not as dissatisfied with their living conditions as we initially assumed. The outlook seemed bleaker than it actually is to the occupiers. Judging from the point of a spectator or a bystander the area seemed highly lacking in a lot of services and community needs. The poor roads to the estates results into the poor drainage which usually accompanies bad roads. The lack of water ensures that the sewage system is not communal or functioning appropriately.

The locals are mainly of the opinion that the services they get are what they deserve, and the government is doing its best to alleviate their sufferings. This is quite an optimistic view as the researcher believes the government should be able and doing more. The government invokes different taxes on the populace but the returns are not commensurate with what is offered in terms of services. The infrastructure is insufficient and unable to handle the population density and what exists is also not being maintained appropriately. There is a need for heavy government investment on the moribund and decaying infrastructure otherwise it is a problem that would get worse. The finance and were withal required for repair and new build infrastructure is huge and would need a combination of financial instruments and public-private-partnership ventures (PPP) to bring it to pass effectively and speedily. A good example of the use of private companies is the waste disposal which was mainly contracted out and even though we

have the LAWMA also operating alongside the work has been reduced in scope to a sizeable portion that allows them to work effectively and grow in a sufficient proportion to their ability.

What would be great would be an increase in the numbers of road maintenance or building companies that could augment the bad drainage and road conditions in the estates and maybe leave the major roads to the government or bigger contractors. Water is already provided by the individual estates using boreholes and overhead storage tanks to supply. However, the distribution of this water from the tanks could be better improved to ensure that all households get water and also that the quality of the water received is similar and properly treated prior to consumption to limit diseases and its transference.

It is quite apparent that the government propaganda machinery generates a media hype that everything is functioning well or very close to it. It is then glaringly obvious when the basic fundamental attached to good housing such as electricity, water, drainage, good roads, proper sewage and waste collection still remains missing. Sustainability is low on the government or individuals agenda and understandably so. However, it is imperative as highlighted above in the research that the government use this opportunity to play catch up in providing this much needed social service.

9.03 Recommendations

With Lagos bulging at the seams and struggling to cope with the demand, state authorities simply have no choice but to create a gambit of different developer attraction packages stemming from the allocation of land, relaxing the planning laws, reducing the cost of approvals, and removing some approval requirements entirely. Lagos should also look at the possibility of privatising that part of the process by giving it to a more organised and focused group or organisation. The private sector can best execute, direct and manage the production of housing units, but it is the government that must enable, facilitate and regulate the process (Soludo, 2003).

Although human settlement financing has faced varied challenges in the past, new modalities for financing urban development have started to emerge in Africa, including infrastructure bonds, variants of land value-capture, mortgage re-financing facilities, and micro-lending for housing. In addition, more countries have put in place instruments for accessing local and global capital markets and robust fiscal mechanisms being developed for mobilizing and deploying resources for urban development. These financial advances are taking place against the backdrop of an evolving financial landscape and there is also a new dynamism unfolding on the continent.(Uwagebulam, 2014).

The Nigerian Institute of Architects (NIA) is in a position to put pressure on the government and encourage them to place housing at the top of their policy agenda. There is often little intrinsic motivation on the part of the state government, but professional bodies and public organisations can provide motivation and reasons for a redesign of housing and planning policy. This kind of muscle and voice can most effectively be used and will have maximum impact at key political junctures. The government would be compelled to listen as they are dependent on the votes of these essential gatekeepers and public figures.

Even though the bulk of housing will be completed by the major house builders it's recognised that the input from local small developers is immense and helps to augment the numbers and reduce the deficit. The small house builders also endeavour to build differently, in a more homely yet cost-effective manner, utilising existing infrastructure to its maximum advantage. In the state like Lagos it's popular to have a home owner's next step as building property to rent out in the long term as an investment vehicle. If financial costs were made easier, more homeowners would, as a next step, venture into building commercially for long term investment. This could serve as a vehicle for increasing the number of housing units provided per year in the state. The government is advised to set up a scheme for home owners that can be called the homeowners development guild scheme. What this would provide would be

a core group of experienced builders which have been tried and tested and know what the key issues are to providing a home for others to live in. These developments will be close to their existing residences and should not be too difficult for them to initiate, supervise and complete in the smallest amount of time that would make it a worthwhile investment. With the building pattern in Lagos constantly improving due to a more organised building method of construction such as better safe guarding of the sites, utilising proper form boards, procuring ready mixed wet concrete for pouring on large sites and even private home owners sites. The emphasis is put on upfront investment in infrastructure to provide serviced plots for high quality homes, backed by master plans and design codes to maintain quality.

The state government has the task of investing heavily in the infrastructure that would enable the housing development to be viable and attractive to the stakeholders. This investment would create good roads to the estates, good electricity supply, pipe-borne water, good drainage and sewage for waste. The state government receives taxes from the populace and these taxes should be used for their benefit. In fact, the ministry of works' main tasks is to ensure a proper provision of this vital services and facilities otherwise they are in dereliction of their duties. Following the provision of this services as requested, the state government will be expected to organise the acquisition of this and also maintain them through its lifetime. The maintenance of these items like good roads, security, waste disposal, plastering, painting landscaping in various estates is crucial as this portrays to outsiders a clean, organised and well maintained estate.

All the evidence suggests therefore that, given current government priorities, the future output of additional sustainable homes is going to be increasingly dependent on private-sector activity and sites secured through planning-gain mechanisms. Part of the reason for this is that the government is trying to remove the misconception that poor people are not wanted in the state, as a number of citizens are complaining that the cost of living in Lagos is prohibitively high. The view is that only the rich can afford to live in the Lagos state environs as costs of rents and leases of property are skyrocketing. The recently launched HOMS scheme is targeted at key workers and staff of Lagos state who would not normally be able to get on the property ladder.

9.04 Answers to research questions and achievement of objectives

1. How do the householders feel about the homes they live in?

   The research has shown that, contrary to initial perception, the householders are not as unhappy as previously assumed. They like some of the aspects of the housing provision and are concerned typically about the state of the infrastructure. The design is adequate and the spaces created are ideal for their needs, although some of them get overpopulated.

2. What are the householder's thoughts on government impact on their environment and infrastructure?

   They would like proper maintenance of the facilities and are not impressed with the government efforts at improving their environment. The householders feel the government should and can do much more than they are presently doing, and are concerned that things may get worse before it gets better. The research also highlights the fact that the relevant government departments responsible for maintenance and development are not able to offer this service adequately. This confirms the reason why a number of these schemes are falling into disrepair and are not being well maintained.

3. Are designers driving sustainable construction from inception and impacting housing production?

   Designers have a key role to play but are not driving sustainable construction in any measurable way. Research shows inconsistency in the effort. The initial housing designs do satisfy the basic architectural rules and laws of design but overall there is a lack of consistency and desire to push boundaries and chart new frontiers in the residential housing market. Research highlights that housing design has not changed very much over the years. Even though some efforts are being made in design, it is not translated across the sustainable housing sector and is sometimes seen only in houses for the elite. The government needs to lead the way in research and development of sustainable housing materials and alternatives to the standard cement blocks and aluminium roofing sheets used mainly in the typical house construction.

4. This framework for housing delivery seeks to assess both how the inhabitants are affected by housing policy in the infrastructure sector and how greater accountability in service delivery improves the assets and capabilities of the inhabitants. The findings of the research will enable the voices of the inhabitants to be heard in policy discussions, as well as to ensure that publicly or privately provided services are specifically targeted to the needs of the inhabitants.

Following the research, it was obvious that a new framework model of the design and build process for sustainable housing was necessary and, if so, how observations of the case studies design process can be combined with previous research findings to create such a model.

The research reports a survey of project team members' views on the existing design and build process. This revealed that the existing process did not encourage sustainability to be incorporated into the design and build projects. It is apparent that a new model of the design and build process for sustainable housing would be helpful, along with guidance in the form of a checklist.

However, it is important to note that a new model is not sufficient to encourage the development of sustainable housing.

The government has conflicting motivations and priorities. Some project team members have more power than others to promote their interests through presenting situations in a particular way, or through exclusion of other members. The different team members are involved at different stages of the design process but usually the project manager or government/client who see the building through the entire design and build process are solely involved in the design and implementation. This therefore could reflect their motivations and drivers and be somewhat biased because of this.

Going forward in Lagos state, the following can be achieved:

1. A sustainable house design methodology can be used to design alternatives of low-income housing in order to minimize cost and environmental impact while maximizing the social acceptability in housing projects.

2. The results of the survey show that the low-income group cannot afford new houses in Lagos even with consideration of the following: constructing multi-storey housing units such as apartment systems through using the concrete frame structure and building the internal and external walls with concrete blocks with limited areas (65-120) square meters. e.g. Lagos state development in Igbogbo.

3. The findings could be used to improve housing affordability through housing policies in Lagos in order to decrease the housing shortage particularly for the low-income group

Too often in the past, housing has been built with the necessary infrastructure following, rather than preceding it. However, the government is now trying to ensure that there is sufficient infrastructure from the outset. This increases costs and adds time to the completion program. This also discourages some prospective private developers, who feel that this should be fully the remit of the local government or state government.

4) Identify funds for the new transport links, health services and schools to serve the new housing developments. To allay local community concerns that the new house-building will put extra strain on existing services, a more structured approach is required with forward funding mechanism in place to demonstrate that the facilities will be in place as the first residents move in, and that revenue funds are available to support them in the long term.

In addition to examining the amount of new house-building required the government also need to consider

a. Housing needed to meet housing requirements and aspirations;
b. How the house-building programme can be linked with urban regeneration, and
c. How the development process should be managed to ensure infrastructure is provided and the negative environmental impact is minimised.

Finally the development of the decision analysis framework through the research has provided a structured platform required for improving the process and outcome of decision making on investment in sustainable housing. The Framework is a site specific evaluation tool which can be applied on a project by project basis. It's robust user friendly and easy to navigate to a conclusion.

In the pursuit of the aim of this research the study undertook the following objectives and came to these respective conclusions:

(1). The literature review conducted using electronic databases, searching of national and international journals, bibliographies of relevant papers, citation search, inter-library loan facilities for relevant materials, textbooks and published Ph.D. theses, helped in establishing the current body of knowledge on

the sustainable housing design and policies and gave information and insight into the prevailing problems and assessing the present status.

(2) The research adopted a pragmatic approach combining both qualitative and quantitative approaches. Prior to the primary data collection phase of the research, ethical approval was sought for and obtained from the University of Wolverhampton's School of Technology Ethics Committee.

(3) The research analyzed data using various research methodology tools including documentary analysis of documents, with questionnaire surveys used to obtain data from a large number of participants. Focus group was also used to discuss together in a purposeful and moderated manner, the topic under research. The researcher invited the group to attend and explore the provisional findings by describing them to the participants. It was a good way of obtaining the thoughts and feelings of a collection of people about the research topic. The group felt the framework was a tool that the three different groups can key into and have as a guide to streamline direction and also coordinate strategy.

(4) The researcher developed a framework that can aid implementation of sustainable affordable housing in Lagos, Nigeria. The relevant information, gathered through the literature search on sustainable housing and design and technology impact from the user's viewpoint and their interrelationships, was analyzed, resulting in the development of the conceptual framework. The framework showed how good policy and design techniques could be used to promote better sustainable housing schemes in contracting organisations and other issues that have to be considered such as challenges and negative impacts. In order to fully develop the conceptual framework, an exploratory pilot study was undertaken through semi-structured interviews conducted with housing ministry officials and developers from contracting organisations and analysis of questionnaire results. The qualitative data obtained was analyzed also using thematic/content analysis approach in areas and the findings were used to refine the framework. This framework can be used to help formulate policy, prepare and implement an action plan and also monitor and report performance.

9.05 Future Work

From this research, topics for future work to enable the delivery of sustainable housing are identified. These lead on from the previous section and could form a program of research for the next ten years. Developing detailed ideas for further conceptual work has proved challenging, because the findings from the present research do not fully align with the initial expectations. These expectations, reflected in some of the objectives and research questions set, were as below:

1. How do the householders feel about the homes they live in?

   They felt much better than envisaged; therefore scope for further research was the psychological aspect and what has led to this feeling of acceptance of seemingly poor service and decrepit infrastructure.
2. What are the householders thought on government impact on their environment and infrastructure?

   The Householders thoughts can be further examined on their expectations of government and its services. A questionnaire survey of prospective tenants or owners of the sustainable housing could be completed. This would help to assess their attitudes towards sustainable housing. It would also inform future phase of the housing development, inform policy makers and members of the construction industry of what needs to be completed to improve and deliver sustainable housing.
3. Are designers driving sustainable construction from inception and impacting housing production?

   Designers are not driving sustainable construction as well as should be expected. Their voices are not being heard and it is having severe impact on the quality and delivery of housing. As noted in chapter 3 especially, for a developing country it would be an opportunity to work to create a new sustainability mandate. The designer would have the freedom to create a sustainable environment of a large urban environment and have an impact on the future of development in that nation.

4. Another area of further research would be the extended assessment of designers' impact on housing delivery using new materials or better methods of construction. Assessing other states apart from Lagos state, especially Ogun state, that Lagos state border on various boundaries would be another direction for future research.

References

Acioly, C., 2011. *UN Habitat,* Nairobi: UN.

Adebayo, S. B., Abdoulaye, T., Sanogo, D. & Langyintuo, A., 2010. *Characterization of maize producing households in the dry savannah of Nigeria - DTMA country report,* Ibadan: OAU - IITA.

Adebayo, S. B. A. T. S. D. a. L. A., 2010. *Characterization of maize producing households in the dry savannah of Nigeria - DTMA country report,* s.l.: OAU- IITA.

Adebiyi, M. A. & Dauda, R. O., 2001. *"Infrastructural services" Perspectives on Nigerias fledgling fourth republic.* Lagos: Malthouse Press Ltd.

Adegoke, B., 2010. *Problems of Direct Labour projects procurred in Lagos state,* Lagos: Grin.

Adeleye, A., 2008. *Experimental reimbursable seeding operations (ERSO),* Stockholm: ERSO, UN Habitat.

Adenaike, F. A., 2013. *Designing sustainable buildings: reinventing the architectural problem solving model for efficacy in sustainability.* Abuja, Architects registration council of Nigeria, pp. 222-238.

Adenuga, A. O. & Dosunmu, S. O., 2012. Assessment of procurement methods used for executing maintenance works in Lagos state. *Ethiopian Journal of environmental studies and Management EJESM Vol. 5 no. 4 (suppl.1).*

Adewolu, A. O., 2003. *Affordable urban integrated community dwellings units in Lagos,* s.l.: s.n.

Adeyanju, O. D., 2012. *An assessment of the impact of corporate social responsibility on Nigerian society: The examples of banking and communication industries.* [Online] Available at: http://www.universalresearchjournals.org/ujmbr [Accessed 6 April 2015].

Afshar, A., Alaghbari, W., Salleh, E. & Salim, A., 2012. Affordable housing design with application of vernacular architecture in kish island, Iran.. *International Journal of Housing Markets and Analysis,* 5(1), pp. 89-107.

Ajanlekoko, J. S., 2001. *Sustainable housing development in Nigeria - The financial and infrastructural Implication.* Nairobi, s.n.

Akande, O. K. & Adebamowo, M., 2010. *Indoor thermal comfort for residential buildings in hot-dry climate of Nigeria.* Windsor, s.n.

Akinsemoyin, K. & Vaughan-Richards, A., 2009. *Building Lagos.* Lagos: Prestige Books.

Akinyele, I. O., Onifade, I. O. & Afolabi, W. A., 1994. *Poverty reduction and urban violence: The case for street food vendors in Nigeria.* Ibadan, Intec Printers.

Akinyele, R. A., 2009. Contesting for space in an urban center: The Omo Onile syndrome in Lagos. In: *African cities: competing claims on urban spaces - Africa-Europe group for interdisciplinary studies.* Netherlands: Koninklijke Brill NV, pp. 109-134.

Akinyosoye, M., 2010. *Infrastructure development in Nigeria, road map to sustainable development,* London: Greenhill technical services ltd.

Alabi, O. T., 2009. The roles of Non-governmental organizations in housing delivery in Nigeria. *Journal of estate surveying research,* June, 1(2), pp. 9-18.

Alao, T., 2014. stakeholders task lagos state on the ijora-badia plan. *Guardian Newspaper,* 28 July.

Alufohai, A. J., 2013. *The Lagos state 2010 mortgage law and the supply of housing.* Abuja, International federation of surveyors, p. 35.

Aluko, O., 2007. *Housing and Urban Development in Nigeria.* Ibadan: Kins.

Aluko, O., 2011. The Effects of Location and Neighbourhood Attributes on Housing Values in Metropolitan Lagos. *Ethiopian Journal of Environmental Studies and Management ,* 4(2), pp. 69-82.

Aluko, O., 2012. Impact of poverty on housing condition in Nigeria: A case study of Mushin local government area of Lagos state.. *Journal of African studies and development Vol. 4 (3),* pp. 81-89.

Aluko, O. E., 2011. Sustainable Housing, Population Growth and Poverty: The Implications on Lagos Mega City. *Journal of Sustainable Development,* August.4 (4).

Aluko, O. O. & Fadamiro, J. A., 2015. Urbanization and sustainable city development: A study of agility and Panada in Lagos Metropolis. *Civil and Environmental Research,* 7(5).

Amao, F. L. & Ilesanmi, A. O., 2013. Housing delivery in Nigeria: Repackaging for sustainable development. *International journal of Asian and African studies,* Volume 1, pp. 80-85.

Aminu, G. W. & Ruhizal, R., 2013. Housing Policies and Programmes in Nigeria: A Review of the Concept and implementation. *Business Management Dynamics,* August, 3(2), pp. 60-68.

Anderson, R., 2007. *http://www.wellknowingconsulting.org/index.html.* [Online] Available at: http://www.wellknowingconsulting.org/index.html [Accessed 14 july 2013].

Anon., n.d. s.l.: s.n.

Anon., n.d. s.l.:s.n.

Anonymous, 2010. The Washington court housing survey; A study of accessibility and universal design in affordable housing - executive summary. *Journal of Affordable housing and community development law,* January, 19(2), pp. 191-204.

Aribigbola, A., 2008. Housing policy formulation in developing countries: Evidence of programme implementation from Akure, Ondo state, Nigeria.. *Journal of Human Ecology,* 23(2), pp. 125-134.

Aronson, J., 1994. *A Pragmatic View of Thematic Analysis.,* s.l.: The Qualitative Report.

Asojo, 2010. s.l.: s.n.

Atkinson, S., 1993. Urban Health in the Third World: A Guide to the literature. *Environment and Urbanization,* 5(2).

Attmann, O., 2008. *Green Architecture - advanced technologies and materials.* New York: McGraw Hill.

Attride-Stirling, J., 2001. Thematic networks: an analytic tool for qualitative research.. *Qualitative Research,* 1(3), pp. 385-405.

AUA newletter, 2013. Afribat Forum. *AUA Newsletter,* August, p. 4.

Aurand, A., n.d. Does Sprawl Induce Affordable Housing?. *Growth and Change: A journal of Urban and regional articles,* 44(4), pp. 631-649.

Awodele, O. A., Ogunsemi, D. R. & Rotimi, J. O., 2008. *Private Participation in Infrastructure (PPI) Development in Developing Economies - The Nigerian Experience.* Dublin, RICS.

Ayodeji, O., 2011. An examination of the causes and effects of building collapses in Nigeria. *Journal of Design and Built Environment,* December, Volume 9, p. pp. 37–47.

Bailey, J., 2008. First steps in qualitative data analysis: transcribing. *Family Practice,* 25(2), pp. 127-131.

Balch, G. I. & Mertens, D. M., 1999. *Focus group design and group dynamics: lessons from deaf and hard of hearing participants.* [Online] Available at: http://aje.sagepub.com/cgi/content/abstract/20/2/265 [Accessed 29th July 2013].

Bamgbose, A. J., 2009. Falsification of population census data in a heterogeneous Nigerian state: The fourth republic example. *African Journal of Political Science and International Relations,* August, 3(8), pp. 311-319.

Barker, K., 2004. *Review of Housing Supply,* London: HM Treasury.

Beadle, K., 2008. *Analysis of the design Process for low energy housing,* Leicester: De Montfort University.

Beecher, F., 2009. *www.ixda.org/node/18705.* [Online] [Accessed 26 May 2011].

Blaikie, N., 1993. *Approaches to Social Enquiry.* 1st ed. Cambridge: Polity Press.

Blaikie, N., 2003. *Analyzing quantitative Data: from Description to Explanation.* 1st ed. s.l.:Sage Publications.

Bokalders, V. & Block, M., 2010. *The whole building handbook- How to design healthy, efficient and sustainable buildings.* s.l.:Earthscan.

Bordignon, B., 1998. *"A systems design approach for sustainable affordable housing",* ., Toronto: Department of Civil Engineering.

Boyatzis, R. E., 1998. *Transforming Qualitative Information: Thematic Analysis and Code Development*.. s.l.:Thousand Oaks: SAGE Publications..

Boyce, P. R., 2009. *The impact of light in buildings on human health.* Seoul Korea, s.n.

Bradley, D., Stephens, C., Harpham, T. & Cairncross, S., 1999. *A Review of Environmental Health Impacts in Developing Countries, Urban Management Programme Discussion,* Washington, DC: The World Bank.

Braganca, L., Almeida, M., Mateus, R. & Mendonca, P., 2002. *Comparison between conventional and MBT constructive solutions from an economic and environmental point of view*.. Coimbra, O. Ural, V. Abrantes & A. Tadeu (Ed.).

Braun, V. & Clarke, V., 2006. Using Thematic Analysis in Psychology.. *Qualitative Research in Psychology,* 3(2), pp. 77-101.

Brisbane city council, 2005. *www.brisbane.qld.gov.au/documents/ ...bbc7737_sustainable_house.pdf.* [Online]
Available at: www.brisbane.qld.gov.au/documents/ ...bbc7737_sustainable_house.pdf [Accessed 20 October 2012].

Bronfenbrenner, U., 1979. *The ecology of human development: experiments by nature and design.* Cambridge: Havard University Press.

Brown, G., 2007. *Architectural Evangelist,* New York: http://www.architecturalevangelist.com/.

Bryman, A., 2008. *Social Research Methods.* 3rd ed. Oxford: Oxford University Press..

Buckley, J. W., Buckley, M. H. & Chiang, H., 1976. *Research Methodology & Business Decisions,* Florida: National Association of Accountants.

Buglear, J. & Fisher, C., 2004. *Researching and writing a dissertation for Business students.* Harlow: Financial times Prentice Hall.

Bullen, C. R., 2000. A low Energy housing design in an area of high wind and rain - An innovative housing scheme at Stenness on Orkney islands.. *Energy and Buildings,* Volume 32, pp. 319-326.

Burgess, R. & Jenks, M., 2000. Compact cities: sustainable urban forms for developing countries. In: London: Spon Press.

Cannell, C. F. & Kahn, R. L., 1989. *New techniques for Pre-testing survey questions.* Michigan: University of Michigan.

Carriger, S. M., 2000. *http://www.dogbert.mse.cs. cmu.edu/../resdes.pdf*.. [Online]
Available at: http://www.dogbert.mse.cs. cmu.edu/../resdes.pdf. [Accessed 22 March 2012].

Chow, S.-C. & Liu, J.-P., 2008. *Design and Analysis of clinical Trials: Concepts and methodologies*.. 2nd ed. New Jersey: John Wiley & sons.

Chueca, P., 2009. *Today's City Houses - Architectural design,*. s.l.:Links International Press.

CIEF, 2005. *Whole life sustainability: Costing, assessment and valuation,* Glasgow, Manchester, London: s.n.

City Mayors, 2015. *"The world's fastest growing cities and urban areas from 2006 to 2020".* [Online] Available at: http://www.citymayors.com/statistics/urban_growth1.html [Accessed 23 september 2015].

Clark, G., 2012. *National Planning policy framework- communities and local government UK,* London: Environment Agency.

Clegg, N., 2012. *www.gov.uk/government/speeches/deputy-prime-ministers-speech-to-national-house-building-council.* [Online] Available at: https://www.gov.uk/government/speeches/deputy-prime-ministers-speech-to-national-house-building-council [Accessed 27 July 2013].

Cole, R., 1998. 'Emerging Trends in Building Environmental Assessment Methods',. *Building Research and Information,* 26(1), pp. 3-16.

Cole, R., 2000. Building Environmental Assessment Methods: Assessing Construction Practices,. *Construction Management and Economics,* pp. 949-957.

Collis, D., 2009. *Social grade- A classification tool,* London: Ipsos Media CT.

Commission for Africa, 2005. *Our common Interest- Report of the commission for Africa,* s.l.: Commission for Africa.

Community toolbox, 2013. *http://ctb.ku.edu/en/table-of-contents/implement/phsyical-social-environment/affordable-housing/main.* [Online] [Accessed 15 April 2014].

Cooper, D. R. & Schindler, P. S., 2006. *Business Research Method.* 9th ed. Boston: McGraw-Hill Irwin.

Cornwall Housing, 2014. *http://www.cornwall.gov.uk/housing/affordable-housing/what-is-affordable-housing/.* [Online] Available at: http://www.cornwall.gov.uk/housing/affordable-housing/what-is-affordable-housing/ [Accessed 13 April 2014].

Cornwall, A., 2002. *Beneficiary consumer citizen: Perspectives on participation for poverty reduction,* Sweden: Swedish International development agency.

Creswell, J. W., 1998. *Qualitative inquiry and research design choosing among five traditions.*. Thousand oaks, CA: Sage publications.

Creswell, J. W., 2009. *Research Design; Quantitative, Qualitative and Mixed Methods Approaches.*. 3rd ed. London: SAGE Publications.

Crook, A. D., Monk, S. R. & Whitehead, C. M., 2006. Planning gain and the supply of new affordable housing in england: Understanding the numbers.. *The Town Planning Review,* 77(3), pp. 353-373.

Dalgliesh, C. D., Bowen, P. A. & Hill, R. C., 1997. Environmental sustainability in the delivery of affordable housing in South Africa.. *Engineering, Construction and Architectural Management,* 4(1), pp. 23-39.

Daramola, S. & Aina, O., 2004. *Planning Policies and Affordable Housing in Nigeria-An analysis of the Abuja Master-Plan Scheme and the re-certificate of Occupancy Syndrome.* Belfast, Housing Studies Association Conference, Belfast, UK.

Davidson, A., 1999. Alternative models of social housing: tenure patterns and cost – rating in New Zealand and Sweden. *Housing Studies,* Vol. 14(4), pp. 453-472.

Davis, M., 2006. *Planet of slums.* London: Verso.

De Vaus, D. A., 2002. *Surveys in Social Research.* 5th ed. Crows Nest: Routledge Publishers.

Deakin, M., Curwell, S. & Lombardi, P., 2001. BEQUEST: The Framework and Directory of Assessment Methods. *International Journal of Life Cycle Assessment,* 6(6), pp. 373-383.

Denzin, N. K. & Lincoln, Y. S., 1994. *Handbook of qualitative research.* London: Sage Publications.

Department for communities and local government, 2007. *Sustainability Code,* London: Department for communities and local government.

Department for communities and local government, 2011. *Impact assessment for affordable rent,* London: Department for communities and local government.

Descombe, M., 2010. *The good research guide for small scale local research.* 4th ed. Maidenhead: Open University Press.

Dunn, M., Rawson, M. & Rogers, A., 1981. *Rural Housing competition and Choice.* London: George Allen and Unwin Ltd.

Durotoye, A., 2014. The MINT Countries as Emerging Economic Power Bloc: Prospects and challenges. *Developing Country Studies,* 4(15).

Easterby-Smith, M., Thorpe, R. & Jackson, P., 2008. *Management Research.* 3rd ed. London: Sage Publications Ltd.

Ebie, F., 2004. Statutory components on housing policy – legislative and regulatory requirements of the new housing policy. *Housing today,* Vol. 4 (No. 8), pp. pp 6-9.

Echenique, M. H., Hargreaves, A. J., Mitchell, G. & Namdeo, A., 2012. Growing cities sustainably: Does urban form really matter. *Journal of the American Planning association,* 3 May.

Edwards, B., 2005. *Rough guide to sustainability.* London: RIBA Enterprises.

Edwards, B., 2010. *Rough Guide to sustainability.* London: RIBA Publishing.

Edwards, B. & Turrent, D., 2013. Sustainable housing: principles and practice. In: London: E & FN Spon.

Ekwere, E. & Tang, C. M. L., 2010. Dearth of automation: The consequences in Nigerian construction industry. *IPEDR*, pp. 1-7.

Enisan, O. & Ogundiran, A., 2013. Challenges of housing delivery in metropolitan Lagos. *Research on Humanities and social sciences*, 3(20), p. 9.

Enitan, S., 2011. *Strategies for Mass-Housing minimum wagers in Nigeria.* Lagos, Nigerian institute of estate surveyors and valuers - lagos state Branch, p. 26.

Environment Bureau, Hong Kong, 2013. *www.enb.gov.hk/en/files/WastePlan-E.pdf.* [Online] Available at: http://www.enb.gov.hk/en/files/WastePlan-E.pdf [Accessed 21 July 2013].

Eriksson, P. & Kovalainen, A., 2008. *Qualitative methods in business research.* 1st ed. London: Sage Publications.

Eurostat, 2008. *waste statistics - long term trends*, s.l.: http://epp.eurostat.ec.europa.eu/.

Farinmade, A., 2012. The Challenges of Improving Informal Sector Activities Conditions in Lagos Island, Nigeria. *British Journal of Arts and Social Sciences*, Vol.6(2).

Farr, D., 2008. *Sustainable urbanism: Urban design with nature.* New Jersey: John wiley and sons.

Fasakin, J. O. & Ogunsemi, D. R., 2003. Modeling the selling prices of residential building in Nigeria. *Journal of Financial Management of Property and Construction*, pp. 111-114.

Fasinro, H. A. B., 2004. *Political and cultural perspectives of Lagos.* Lagos: Academy Press Plc. Lagos.

Federal Government of Nigeria, 2005. *Government white paper on the report of the presidential committee on strategic plans for engineering development and control in Nigeria*, Lagos: Federal government Printer.

Federal Government of Nigeria, 2011. *The National Housing Policy*, Abuja: Federal Government of Nigeria.

Flowers, P., 2009. *Research Philosophies - Importance and relevance*, Cranfield: Cranfield school of management.

Fraser, I., 2011. *Fidelity is confident its MINTs won't suck,* Bloomsbury: Bloomsbury Information Qfinance.

Friedman, A., 2005. *Homes Within Reach: A Guide to the Planning, Design, and Construction of Affordable Homes and Communities.* NJ: Wiley, Hoboken.

Gentileschi, L. M., 1999. *http://www.csiwisepractices.org/?read=22.* [Online] Available at: http://www.csiwisepractices.org/?read=22 [Accessed 12 January 2011].

Ghandi, D., 2007. The limits and promise of environmental ethics: Eco-socialist thought and anthropocentricism's virtue.. *Environs: Environmental Law and Policy Journal*, 31(1), pp. 35-58.

Giaconia, 2010. *Reducing energy consumption and CO2 emissions in European countries: a review.* [Online].

Gibbs, G., 2007. *Analysing Qualitative Data In:*. London: Sage qualitative research kit.

Gilbert, Alan, n.d. *A policy guide to rental housing in developed countries: quick policy guide series,* Kenya: UN Habitat.

Glemarec, Y., 2011. *Catalysing climate finance: A guidebook on policy and financing options to support green, low-emission and climate resilient development United Nations development program.* New York: s.n.

Godwin, J. & Hopwood, G., 2012. *Sandbank City Lagos at 150.* Lagos: Kachifo Limited.

Goetz, E. G., 2008. Words matter: the importaance of issue framing and the case of affordable Housing. *Journal of American planning association,* April.74(2).

Gore, A., 2006. *An Inconvenient Truth.* London: Bloomsbury publishing Plc.

Gravetter, F. J. & Forzano, L.-A. B., 2012. *Research Methods for the Behavioural Sciences.* 5th ed. Stamford: cengage learning.

Grey, M. S., 2012. The role of low-income urban housing delivery schemes in curbing the housing problem in the city of Mutare, Zimbabwe. *Journal of Sustainable Development in Africa,* 14(1), pp. 202-216.

Gyoh, L., 2013. *Sustainable environmentally responsive passive building in the hot humid climate- A case study of PIND alternative technology enabled development (ATED) building Warri, Delta state, Nigeria.* Abuja, Architects registration council of Nigeria, pp. 196-209.

Haddad, L., Ruel, M. T. & Garrett, J. L., 1999. Are urban poverty and undernutrition growing? Some newly assembled evidence. *World Development,* 27(11), pp. 1891-1904.

Hadikusumo, B. H., (2005). Construction material procurement using Internet-based agent system. 14(6), pp. 736-749.

Halliday, S., 2008. *Sustainable construction.* s.l.:Butterworth-Heinemann.

Hamilton, A., Curwell, S., Mitchell, G. & James, P., 2009. Decision Support for Sustainable Urban Development. In: *Sustainable Urban Development Volume 3: The Toolkit For Assessment.* Abingdon: Routledge, pp. 17-37.

Harpham, T. & Tanner, M., 1995. *Urban Health in Developing Countries: Progress and Prospects.*. London: Earthscan Publications.

Harriott, S., Matthews, L. & Grainger, P., 1998. *Social Housing: An Introduction.* Essex: Longman.

Haughton, G. & Hunter, C., 1994. *Sustainable Cities.* London: Jessica Kingsley.

Henshaw, G., 2010. *The role of private sector in the provision of affordable housing to the public,* Calabar: Nigerian society of engineers.

Hiles, D., 2001. *Heuristic inquiry and Transpersonal research,* London: CCPE.

Hodder, S., 2014. Political Intervention. *RIBA Journal,* July, 121(07), p. 45.

Hoffman, A. v., 1996. High Ambitions: The past and future of American low income Housing Policy. 7(3), pp. 423-446.

Hogwood, B., 1987. *From Crisis to Complacency? Shaping public policy in Britain.* Oxford: Oxford University press.

Holloway, I. & Todres, L., 2003. The status of method: flexibility, consistency and coherence.. *Qualitative Research,* 3(3), pp. 345-357.

Holmans, A., Monk, S. & Whitehead, C. M., 2004. *Building for the Future: 2004 Update,* London: Shelter.

Hornby, A. S., 1995. *Oxford Advanced Learner's Dictionary of Current English.* 5th ed. Oxford: Oxford University Press.

Huovila, P. & Curwell, S., 2007. Sustainability Assessment of Building Design, Construction and Use. In: *Sustainable Urban Development Vol. 2: The environmental assessment methods.* Abingdon: Routledge, pp. 329-347.

Ibem, E. O., Aduwo, E. B. & Akunnaya, P. O., 2013. Residents Transformation of Dwelling Units in public housing estates in Lagos, Nigeria: Implications for policy and practice. *International journal of education and research,* April.Vol. 1 (No. 4).

Igbinoba, R., 2009. *The state of Lagos housing market,* Lagos: Roland Ibinoba Real Foundation for Housing and Urban Development (RIRFHUD).

Ilesanmi, A. O., 2010. Urban sustainability in the context of Lagos Mega-city. *Journal of Geography and regional planning,* 3(10), pp. 240-252.

Infrastructure UK, 2010. *Infrastructure cost review,* London: HM treasury.

Integrity reporters, 2013. *http://integrityreporters.com/press-release.* [Online] [Accessed 12 October 2013].

Jain, T. R. & Sandhu, A. S., 2007. *Quantitative Methods.* New Delhi: VK Publishers.

James, R. W., 1987. *Nigerian Land Use Act: Policy and Principles.* Ile-Ife: Obafemi Awolowo University Press Ltd.

Jamieson, S., 2004. Likert scales: how to (ab)use them?. *Medical Education,* 38(12), pp. 1217-1218.

Jenks, M., Burton, E. & Williams, K., 1996. The compact city: a sustainable urban form. In: s.l.:E and F N Spon.

JRF (Joseph Rowntree Foundation), 2002. *Inquiry into British Housing. 1984-1991. What has happened since?,* York: Joseph Rowntree Foundation..

Jular, 2012. *'Tackle climate change use wood'.* [Online] Available at: http://www.jular.pt/pdf//Tackle_Climate_Change_Use_Wood.pdf [Accessed 10 february 2014].

Kardash, H. & Wilkinson, N., 1993. development within development: User extensions of five storey walk up housing in Cairo. In: *Companion to contemporary architectural thought.* London: Routledge Publishing, pp. 63-72.

Kasi, P., 2009. *Research: What, Why and How? A Treatise from Researchers to Researchers.* 1st ed. Bloomington: Author House.

Kerr, A. W., Hall, H. K. & Kozub, S. A., 2002. *Doing statistics with SPSS.* London: Sage publications Ltd.

Kersey, J. R., 2004. *Sustainable construction: implementing targets and indicators: experiences from CIRIA's Pioneers club*. London: CIRIA.

Khaled, A. G., 2014. Sustainable community and user-controlled housing processes in Cairo, Egypt: 'no-harm' principle as a regulatory mechanism. *International Journal of Urban Sustainable Development.*

Kibert, C. J., 2008. *Sustainable Construction: Green building design and delivery.* 2nd ed. ed. s.l.:s.n.

Kim, Y., 2003. *Strategic advantages of information technology in construction,* Boston: Massachusetts institute of technology.

King, P., 2014. Have we worked out what allowable solutions are yet?. *RIBA Journal,* July.p. 27.

Knight, P. T., 2002. *Small-Scale Research: Pragmatic Inquiry in Social Science and the Caring Professions.* London: SAGE Publications.

Kohler, U. & Kreuter, F., 2005. *Data Analysis Using Stata.*. 1st ed. s.l.:Strata Press.

Kolawole, O. D., 2012. *Rural employment- drivers, opportunities and challenges.* Colne: Lambert academic publishing AG & Co. KG.

Krueger, R. A., 1994. *Focus Groups: A practical guide for applied research.* Thousand Oaks: Sage Publications.

Krueger, R. A. & Casey, M. A., 2000. *Focus groups: A practical guide for applied research.* 3rd ed. Thousand Oaks CA: Sage Publications.

Kruger, M., 2008. *https://commons.wikimedia.org/wiki/File:Population_density_map_of_Nigerian_states_-_English.png.* [Online]

Available at: https://commons.wikimedia.org/wiki/File:Population_density_map_of_Nigerian_states_-_English.png

[Accessed 22 October 2015].

Labaw, P. J., 1981. *Advanced questionnaire design.* reprint ed. Michigan: Abt Books.

Lade, O. O., 2013. *A Multi-Criteria Decision Analysis Framework for sustainable rainwater harvesting systems in Ibadan, Nigeria,* Wolverhampton: University of Wolverhampton.

Laerd Dissertation, 2012. [Online] Available at: http://dissertation.laerd.com/sampling-the-basics.php#first [Accessed 25 Mar 2015].

Lagos Bureau of Statistics;, 2012. *Abstract of Local government statistics,* Lagos: Lagos bureau of statistics, ministry of economic planning and budget.

Lagos State Government/ UN-Habitat Office in Nigeria, 2004. *State of the Lagos Mega City and Other Nigerian Cities Report,* Lagos: Lagos State Government.

Lagos State Ministry of Housing, 2011. *Status report on projects commenced under Public Private Partnership,* Lagos: Lagos state ministry of Housing.

Lalasz, R., 2006. *In the News: The Nigerian Census", Population Reference Bureau,.* [Online] Available at: http://www.prb.org/Publications/Articles/2006/IntheNewsTheNigerianCensus.aspx [Accessed 22 september 2015].

Lawanson, 2011. *Assessment of home-based economic enterprises in residential areas of Lagos metropolis.,* Akure: Federal University of Technology, Akure.

Lawanson, T., 2006. *Poverty and Environmental Conditions in the Lagos Megacity: Consequences for Environmental Health.,* Lagos: University of Lagos.

Lawanson, T., Omoayena, Y. & Salako, I., 2012. *Environmental Challenges of Peri-Urban Settlements in the Lagos Megacity.* Tagungsband, Real corps 2012, pp. 275-285.

Lee, C. F., Lee, J. C. & Lee, A. C., 2013. *Statistics for Business and Financial Economics.* 3rd ed. New York: World Scientific Publishing Company.

Leonard, H. J., 1989. *Environment and the poor:development strategies for a common agenda.* 1st ed. New Brunswick: Transaction books.

List, A. J., 2004. Neoclassical theory versus Prospect theory: evidence from the market place. *Econometrica,* Volume 72, pp. 615-625.

Lowe, R., 1986. Communications on Energy: The pennyland low energy housing project - results and lessons. *Energy Policy,* October, pp. 447-450.

Lowe, R., Roberts, D. & Bell, M., 2005. *Developing Energy Performance Standards for UK Housing: The Stamford Brook Project.* Tokyo, World sustainable Building Conference, pp. 4489-4494.

Mabogunje, A., 2004. *Framing the fundamental issues of sustainable development in Sub-Saharan Africa a CID working paper No. 104. Cambridge, MA: sustainable development Program, center for International development, Harvard University; Also published as T,* Cambridge MA: s.n.

Mabugu, R. E., 2008. Environmental sustainabilities in West African countries. In: A. P. Solutions, ed. *The Millenium development goals- achievements and prospects of meeting the targets in Africa.* Pretoria: Solani Ngobeni, pp. 209-230.

Macpherson, D. A. & Sirmans, S. G., 2003. The state of affordable Housing. *Journal of real estate literature,* 11(2), pp. 133-155.

Madaki, S. A. & Ogunrayewa, M. O., 1999. The new national housing policy & shelter challenge. *Journal of Environmental Sciences,* 3 (1), pp. 74 -79.

Maduako, D., 2010. *20/09/2010 http://www.tribune.com.ng/index.php/property-a-environment/11251-fg-commences-off-carbon-trade-campaign-in-Lagos.* [Online]
Available at: http://www.tribune.com.ng/index.php/property-a-environment/11251-fg-commences-off-carbon-trade-campaign-in-Lagos
[Accessed 03 March 2011].

Malpass, P. & Murie, A., 1999. *Housing Policy and Practice.* 5th ed. s.l.:Palgrave Macmillan.

Mandilas Group;, 1999. *Eko Landmarks of Lagos Nigeria.* Lagos: Mandilas group Limited.

Maposa, J., 2012. *http://www.tradeinvestnigeria.com/feature_articles/1297705.htm.* [Online]
Available at: http://www.tradeinvestnigeria.com/feature_articles/1297705.htm
[Accessed 27 September 2012].

Marmol, L. & Radziner, R., 2008. *Between architecture and construction.* 1st ed. Princeton: Princeton architectural press.

Marshall, M. N., 1996. Sampling for qualitative research. *Family Practice,* 13(6), pp. 522-525.

Martens, B., 2009. A political history of Affordable Housing. *Journal of Housing and community development,* Jan/feb.p. 6.

Maslow, H. A., 1943. A theory of human motivation. *Psychological review 50,* pp. 370-396.

Max Fordham, 2012. *British council sustainability guide,* s.l.: s.n.

Mbeng, L. O., 2009. *Impact of public attitudes and behaviour on the effective valorisation of household organic waste into agricultural compost:Case study Limbe and Doula Cameroun,* Northampton: University of Northampton.

McMurray, A. J., Pace, W. R. & Scott, D., 2004. *Research: A common approach.* 1st ed. Victoria: Social Science Press.

Meadows, D., 2012. Durability adaptability and building service life planning as applied to modular construction. *MBI and BD+C Modular advantage,* winter.

Merriam, S. B., 1998. *Qualitative research and case study applications in education.* San Francisco: Jossey-Bass Inc. Publications.

Michaelides, E. S., 2012. *Alternative Energy Sources.* Berlin: Springer-Verlag, Berlin Heidelberg.

Miles, M. B. & Huberman, A. M., 1994. *Qualitative data analysis: An expanded sourcebook.* s.l.:Thousand Oaks, CA: SAGE..

Miller, R. L. & Brewer, J. D., 2003. *The A-Z of Social Research: A dictionary of Key Social Science Research.* London: Sage Publications Ltd.

Ministry of Physical Planning and Urban Development, 2006. *Ikoyi-Victoria Island Model City Plan.* Lagos: Lagos State Government.

Mohlasedi, K. M. & Nkado, R. N., 1997. *The role of stakeholders in the delivery of affordable housing schemes in South Africa.* Cambridge, ARCOM.

Morakinyo, K. O., Ogunrayewa, M. O. & Koleosho, B. O., 2012. Urban Slums as Spatial Manifestations of Urbanization in Sub-Saharan Africa: A Case Study of Ajegunle Slum Settlement, Lagos,. *Developing Country Studies,* p. 11.

Moreno, E. L., Oyeyinka, O. & Mboup, G., 2010. *Bridging the Urban Divide - State of the world cities,* Nairobi: UN Habitat.

Morgan, D. L., 1998. *Focus group as qualitative research series 16.* London: Sage Publications.

Morris, P. & Matthiessen, L. F., 2007. *Cost of Green Revisited: Re-examining the Feasibility and Cost Impact of Sustainable Design in the Light of Increased Market Adoption,* s.l.: Langdon and Everest.

Mosaku, T. O., Kehinde, J. O. & Kuroshi, P. A., 2006. *Control of building practice for sustainable development in Nigeria: matters arising in Okewole. The built environment: innovation policy and sustainable development in Nigeria,.* Ota: Covenant University Press.

Moustakas, C., 1990. *Heuristic Research: Design, methodology and applications.* California: Thousand Oaks, CA .

Munda, G., 1995. *Multicriteria Evaluation in a Fuzzy Environment: Theory and Application in Ecological Economics.* Heidelberg: Physika Verlag.

Munda, G., 2004. Social Multi-Criteria Evaluation (SMCE) : Methodological Foundations and Operational Consequences. *European Journal of Operational Research,* 158(3), pp. 662-677.

Murie, A., 1993. The Changing face of Homeownership in Britain: Divisions, Interests, and the State. In: *Ownership, Control, and the future of Housing Policy.* London: Greenwood Press, pp. 105-120.

Mutunga, C., Zulu, E. & Mark De Souza, R., 2012. *Population dynamics, climate change and sustainable development in Africa,* s.l.: Population Action international (PAI) and African Institute for development policy (AFIDEP).

Naess, A., 1989. *Ecology, Community, and Lifestyle: Outline of an Ecosophy.* s.l.:Cambridge University Press.

National bureau of statistics, 2012. *Social statistics in Nigeria,* Abuja: National Bureau of Statisitcs.

National Population Commission, 2013. *www.population.gov.ng.* [Online].

National Renewable Energy Laboratory, 2001. *Low Energy Building Design Guidelines,* s.l.: US Department of Energy.

Ndubueze, J. O., 2009. *Urban housing affordability and housing policy dilemmas in Nigeria,* Birmingham: s.n.

Nenno, M. K., 1991. State and local governments: New initiatives in low income housing preservation. *Housing policy debate,* 2(2), pp. 467-491.

Nenova, T., 2010. *Expanding Housing Finance to the undeserved in South Asia.* Washington, DC: The World Bank.

Nepad, 2001. *Conditions of sustainable development.* Abuja, NEPAD, pp. 16, 18.

Newman, P. & Kenworthy, R. J., 2003. *Sustainable and Cities: Overcoming automobile dependence.* Washington DC: Island Press.

Nigeria, L. S. o., 2011. *Lagos Tenancy Law,* Lagos: Lagos State.

Nightingale, Smith, D. & Pindus, N. M., 1997. *Privatization of Public Social Services: A Background Paper (Research Report), Exhibit One.*. [Online] [Accessed 12 July 2005].

Nkwogu, U. O., 2001. Sustainable Urban Development Policy Issues in Nigeria. In: *Architects and Architecture in Nigeria: A Book of Readings in Honour of Professor Ekundayo Adeyinka Adeyemi.* Owerri: Association of Architectural Educators in Nigeria, pp. 177-208.

Nnanna, 2010. s.l.:s.n.

Norton, M., 2012. *Sustainability:duty or opportunity for business.* 1st ed. Abingdon: Routledge.

Nubi, O. T., 2006. *Real Estate Finance: The Mortgage option.* s.l., s.n.

Nubi, T. & Oyalowo, B., 2010. *Housing Finance between Social Needs and Economic Realities: the Dilemma of Policy Transfer under Neo-Liberalism.*, Lagos: s.n.

Nwaka, G. I., 2005. *The urban poor, the informal city and environmental health policy in Nigeria.* [Online]

Available at: http://www.engagingcommunities2005.org/abstracts/Nwaka-Geoffrey-final.pdf [Accessed 23 April 2014].

ODPM - Housing Planning Local government and the regions committee, 2006. *Affordability and the supply of Housing 3rd report of 2005-2006 Vol. 1,* London: The Stationery office.

Oduwaye, L. & Lawanson, T. L., 2007. Poverty and Environmental Degradation in the Lagos Metropolis. *Journal of Environmental Sciences,* 11(1), pp. 36-70.

Office of government commerce, 2011. *Design quality Indicators,* London: Office of government commerce.

Ofori, G. & Kien, H. L., 2004. Translating Singapore architects' environmental awareness into decision making.. *Building Research and Information,* 32(1), p. 27.

Ogu, V. I. & Ogbuozobe, J. E., 2001. "Housing policy in Nigeria: towards enablement of private housing development".. *Habitat International,* December.25(4).

Okeshola, F., 2012. Challenges facing the realization of Millenium development goals (MDG's) in educational reform in Nigeria.. *European Scientific Journal,* February.8(3).

Okoghenum, J., 2013. *Despite tenancy law, Accomodation seekers face hell in Lagos,* Lagos: Guardian Newspapers.

Okoh, V. P., 2009. Housing the urban poor in Makoko Area of Lagos State. *Journal of Estate surveying research,* June, 1(2), pp. 1-8.

Okparocha-, C., 2014. Lagos to deliver 200 houses every month. *Nigerian Tribune*, 4th February, p. 1.

Okwo, A. & Soboyejo, W. O., 2005. An alternative and holistic approach to affordable housing: homes of foam. *Perspectives on global development and technology,* 5(1-2).

Olagunju, O. A., Oloke, D., Hammond, F. & Costello, P., 2011. *Role of Policy development and implementation in the creation of sustainable affordable housing in Nigeria.* Manchester, COBRA.

Olagunju, O., Oloke, D., Hammond, F. & Costello, P., 2011. *Framework analysis of technology and design of sustainable affordable housing in Nigeria.* Accra, WABER, p. 11.

Olagunju, O., Oloke, D., Hammond, F. & Costello, P., 2012. *'Impact of Policy development and implementation in the construction of sustainable affordable housing in Lagos Nigeria'.* Shenzhen, ICSBE.

Olagunju, O., Oloke, D., Hammond, F. & Costello, P., 2013. *Design and technology and its sustainability impact on affordable housing production in Nigeria.* Abuja, NIA-ARCON.

Olatayo, T. O. & Adeboye, N. O., 2013. Predicting population growth through births and deaths rate in Nigeria. *Mathematical Theory Modelling,* 3(1).

Olorunfemi, F. B. & Raheem, U. A., 2008. Urban development and environmental implications: The challenge of urban sustainability in Nigeria. *Ibadan Journal of the social sciences,* 6(1), pp. 69-78.

Oloto, N. E. & Adebayo, A. K., 2011. *The new Lagos - Challenges facing the Peri urban areas and its relationship with its City centre.* Casablanca: ArchiAfrika.

Olukoju, A., 2003. *Infrastructure development and urban facilities in Lagos 1861- 2000.* Ibadan: <http://books.openedition.org/ifra/814>..

Olusanya, O., 2012. Appropriate High density urban housing prototype for the Lagos Megacity: The garden Atrium Apartment. p. 8.

Olusanya, O., 2012. *Sustainable systems building for Large scale housing production in the Lagos Megacity,* Lagos: University of Lagos.

Oluwaluyi, A., 2008. *Affordable Housing: Masses Hope*. Lagos, Nigerian Institution of Estate surveyors and Valuers- Lagos state branch, p. 8.

Onibokun, A. G., 1990. *Urban Housing in Nigeria.* Ibadan: NISER.

Onwe, D., 2012. *A handbook on Lagos tenancy law.* Lagos: Wicecom Publishers Limited.

Onyeoziri, F., n.d. Civilian regimes: policies and programmes. In: T. N. Tamuno & J. A. Atanda, eds. *Nigeria since independence the first 25 years vol. 4 Govt and public policy.* s.l.:s.n.

Organisation for economic cooperation and development, 2001. *Sustainable development critical issues,* Paris: OECD publications.

Orlebeke, C. J., 2000. The evolution of low income housing policy 1949-1999. *Housing policy debate,* 11(2).

Osbourne, G., 2012. *www.gov.uk/government/news/government-investment-in-local-growth-to-continue.* [Online]

Available at: https://www.gov.uk/government/news/government-investment-in-local-growth-to-continue [Accessed 27 July 2013].

Oshodi, L., 2010. *Population, development and housing in Lagos state,* Lagos: s.n.

O'Sullivan, T. & Gibb, K., 2003. *Housing Economics and Public Policy.* Oxford: Blackwell Science.

Otubu, A. K., 2013. Lagos State Land Use Act (Title Documentation) Regulation 2012. *Nigerian Bar Journal ,* 19 August.

Oyefara, J. L., 2013. Good Governance and environmental Sustainability in Lagos State, Nigeria: Can the state achieve goal seven of Millenium development goals (MDGS)?. *European Scientific Journal,* February, 9(5), pp. 41-55.

Oyelaran-Oyeyinka, R. N. I., 2006. *Governance and bureacracy: Leadership in Nigeria's public service. The case of the Lagos State civil service (1967-2005).* Maastricht: Universitaire Pers Maastricht.

Ozili, P. C., 2009. *A critique of the national housing fund scheme in Nigeria: Land Reform as a tool for national development.* Awka, s.n.

Pagano, R., 2009. *Understanding Statistics in the Behavioral Science*.. 9th ed. s.l.:Wadsworth.

Partners, F. a., n.d. s.l.: s.n.

Patel, S., 2004. Bombay/Mumbai:globalization, inequalities and politics. In: *World Cities beyond the west: globalization, development and inequality.* Cambridge: Cambridge University Press, pp. 11-21.

Pearman, H., 2014. We are the value added. *RIBA Journal,* July, 12(17), p. 39.

Peter, K., 2009. Using Theory or Making Theory: Can there be Theories of Housing?. *Housing, Theory and Society,* 26(1), pp. 41-52.

Petersdorff, C., Wouters, F. & Wiesner, W., 2000. *Evaluation of the solar residential area Gelsenkirchen.*. Cambridge, James and James, pp. 266-267.

Phiri, M., 1999. *Information technology in construction design.* s.l.:Thomas Telford Ltd.

Pieterse, J. N., 2001. *Development theory.* s.l.:Sage publications Ltd.

Popoola, N., 2014. PFAs to invest pension funds in housing. *Sunday Punch -Sunday Business,* 9 March, p. 25.

Rabiee, F., 2004. *Focus group interview and data analysis.* Birmingham, Nutrition Society, pp. 655-660.

Rahman, A. N., Omar, D. & Salleh, G. A., 2012. Determinant factors of neighbourhood quality. *Journal of the Malaysian institute of Planners.*

Raskin, P. et al., 2002. *The great transition: The promise and lure of the times ahead,* Boston: Stockholm environment institute.

Redclift, M., 2005. Sustainable development (1987–2005): An oxymoron comes of age.. *Sustainable Development*, Volume 13, p. 209–211.

Refsgaard, K. & Magnusen, K., 2009. Household behaviour and attitudes with respect to recycling foodwaste-experiences from focus groups. *Journal of Environmental management,* 90(2), pp. 760-771.

Rex, T. R., 2000. Housing affordability worsens for low income families. *Arizona Business* , p. 5.

RIBA, 2010. *www.buildingfutures.org.uk.* [Online] Available at: www.buildingfutures.org.uk [Accessed 2 February 2011].

RIBA, 2014. *http://riba.msgfocus.com/c/1ax78nG4YC2QGne8ZLquHzs.* [Online] Available at: http://riba.msgfocus.com/c/1ax78nG4YC2QGne8ZLquHzs [Accessed 6 March 2014].

Richard, R.-B., 2010. *Applying Industrialised strategies and technologies to the production of building systems,* s.l.: s.n.

Riley, D., Pexton, K. & Drilling, J., 2003. Procurement of sustainable construction services in the United States: the contractors role in green buildings. *Industry and Environment,* 26(2/3), pp. 66-69.

Ritchie, J. & Spencer, L., 1994. Qualitative data analysis for applied policy research.. In: *In Analysing Qualitative Data*. London: Routledge, pp. 173-194.

Robinson, D., 2011. *Computer modelling for sustainable urban design: physical principles methods and applications.* Oxford: Taylor and Francis.

Robson, C., 2002. *Real World Research.* Oxford: Blackwell Publishing Ltd.

Robson, C., 2002. *Real world research.* 3rd ed. s.l.:Wiley- Blackwell.

Salama, A., 2006. "A life style theories approach for affordable housing research in Saudi Arabia". *Emirates Journal for Engineering Research,* 11(1), pp. 67-76.

Sands, R. G., 2001. *Clinical Social Work Practice in Behavioral mental Health: A postmodern approach to practice with adults.*. Needham Heights, MA: Allyn & Bacon..

Saraki, B., 2014. Africa and the failures in Warsaw. *The Guardian*, 20 January, p. 70.

Satthethwaithe, D., 2005. *The under-estimation of urban poverty in low and middle-income nations, .*, s.l.: IIED.

Schilling, J., 2006. On the pragmatics of qualitative assessment- designing the process for content analysis. *European Journal of Psychological assessment,* 22(1), pp. 28-37.

Schnieders, J. & Hermelink, A., 2006. *Cepheus Results: measurement and occupants satisfaction provide evidence for Passive Houses being an option for sustainable building,* s.l.: Energy Policy.

Schwandt, T. A., 2001. *Dictionary of Qualitative Inquiry.* California: Sage Publications.

Senescu, R. & Haymaker, J., 2011. *Communicating Design processes effectively and efficiently,* Stanford: Stanford University.

Seriki, E. & Pullybank, E., 1975. *Visitors guide to Lagos.* Lagos: West African Book Publishers Ltd.

Sev, A., 2009. How can the construction industry contribute to sustainable development? A conceptual framework. *Sustainable Development,* Issue 17, p. 161–173.

Shamoo, A. E. & Resnik, B. R., 2003. *Responsible Conduct of Research..* Oxford: Oxford University Press..

Shatz, S. P., 1977. *Nigerian capitalism.* California: University of California.

Sidawi, B., 2008. "Incorporating lifestyle in the design of affordable housing in Saudi Arabia kingdom". *Emirates Journal for Engineering Research,* 13(2), pp. 67-72.

Smith, M. & Whitelegg, J., 1997. Life Cycle Analysis of Housing. *Housing studies,* 12(2), pp. 215-230.

Smith, S. L., 2011. Incorporating fair housing into affordable policy and programs. *Journal of affordable housing and community development law,* 20(2), pp. 235-237.

Sohail, M. & Cavill, S., 2007. *Partnering to combat corruption in infrastructure services- A toolkit,* Leicester: WEDC Publications.

Solesbury, W., 2013. *World Cities, City Worlds: Exploration with Metaphors, Icons and Perspectives.* Leicester: Troubador Publishing Ltd.

Soludo, 2003.

Soneye, A., 2012. *Population and Climate Change: Towards Climate Compatible Development for Africa: Nigeria Case Study.* Malawi, s.n.

Stake, R., 1995. *The art of case study research.* London & New Delhi: Thousand Oaks,:Sage Publications.

Stephens, M. & Williams, P., 2012. *Tackling housing market volatility in the UK,* London: Joseph Roundtree foundation.

Steven Winter and Associates, 1998. *The passive solar design and construction handbook.* s.l.:John Wiley and sons.

Tang, C. P., 2007. The emergence of the Japanese housing system. In: *The crisis of welfare in East Asia.* Lanham: Lexington Books.

Taye, O. O. & Dada, M. O., 2012. Appraisal of private sector involvement in Infrastructure Development in Lagos State, Nigeria. *Mediterranean Journal of Social Sciences,* May.Vol. 3(2).

Taylor, B., Sinha, G. & Ghoshal, T., 2009. *Research Methodology- A Guide for Researchers in Management and Social Sciences.* New Delhi: Asoke K. Ghosh.

Taylor, R. G. & Norval, G. H., 1994. *Developing appropriate procurement systems for developing countries.* Montreal, CIB W92.

Teijlingen, V. E. & Hundley, V., 2001. The Importance of Pilot Studies. *Social Research Update*, Issue 35, pp. 1-4..

The Central Intelligence Agency, 2013. *The world Factbook.* s.l.:The Central Intelligence Agency.

The National bureau of statistics, 2011. *www.nigerianstat.gov.ng/index.php/pages/sectorstatistics.* [Online]
Available at: http://www.nigerianstat.gov.ng/index.php/pages/sectorstatistics [Accessed 26 July 2011].

This Day, 2009. s.l.:s.n.

Thomark, C., 2006. The effect of material choice on the total energy need and recycling potential of a building. *Building and environment,* 41(8), pp. 1019-1026.

Tiesdell, S., 2004. Integrating affordable housing within market rate development: the design dimension. *Planning and Design,* 31(2).

Tonn, B., English, M. & Travis, C., 2000. A framework for understanding and improving environmental decision making. *Journal of Environmental planning and management,* 43(2), pp. 163-183.

Trager, L., 2001. *Yoruba Hometowns - Community, identity and development in Nigeria.* Ibadan(Oyo State): Spectrum Books Limited.

Trimmer, G. & Kidston, N., 2003. *Assessing procurement,* London: Trimmer CS and the housing corporation.

Trochim, W. M., 2006. *http://www.socialresearchmethods.net/kb.* [Online]
Available at: http://www.socialresearchmethods.net/kb [Accessed 06 10 2012].

Trusty, W., 2001. *Life Cycle Assessment.* Ottawa: Athena Institute.

Tuckett, A. G., 2005. Applying thematic analysis theory to practice: A researcher's experience.. *Contemporary Nurse,* 19(1-2), pp. 75-87.

Tuckett, A. G., 2005. Applying thematic analysis theory to practice: A researcher's experience.. *Contemporary Nurse,* 19(1-2), pp. 75-87.

Turrent, D., 2013. Sustainable housing: Principles and Practice. In: s.l.:E & FN Spon.

Uji, A. Z., 2009. *Tools and Instruments of researchin Design and Allied Disciplines.* Jos(Plateau): Ichejum Press.

Ukaga, O. & Afoaku, O., 2005. *Sustainable development in Africa - A multifaceted challenge.* s.l.:Africa world press.

UN habitat, 2009. *Low cost sustainable building materials and construction technology,* Nairobi: Sustainable Urban Development Network SUD-NET.

UN Habitat, 2010. *Climate change strategy 2010-2013,* Nairobi: Urban environmental planning branch.

UN Habitat, 2010. *State of the worlds cities- Bridging the urban divide,* Nairobi: UN Habitat.

United Nations Secretariat, 1996. *World Urbanization Prospects: The 1996 Revision,,* s.l.: Department of Economic and Social Affairs.

US department of housing and urban development, 2011. *www.hud.gov/offices/cpd/affordablehousing/.* [Online]
Available at: http://www.hud.gov/offices/cpd/affordablehousing/
[Accessed 15 April 2011].

USC Libraries, 2013. *http://libguides.usc.edu/content.php.* [Online]
Available at: http://libguides.usc.edu/writingguide
[Accessed 28 September 2013].

Uwaegbulam, C., 2014. Lagos Housing outlook "still very positive", says report. *Property Guide - The Guardian,* 10 March, p. 39.

Uwagebulam, C., 2014. African Ministers chart new course on financing human settlements. *Nigerian Guardian,* 3rd March.

Uzuegbunam, F. O., 2012. Reflections on Nigerian Architecture and Culture for a sustainable Development of the Hot Humid Tropical Environment. *Journal of Environmental Management and Safety,* 5 March, 3(2), pp. 161-178.

vandenbroucke, M., De Temmerman, N., Paduart, A. & Debacker, W., 2013. *Opportunities and obstacles of implementing transformable architecture.* s.l., s.n., pp. 775-782.

Vanegas, J. A., 2003. Road map and principles for built environment sustainability.. *Environment Science Technology,* Issue 37, p. 5363–5372.

Vhn, 2003. *Wood Product as Carbon Stores.* [Online]
[Accessed December 2012].

Watson, S., 2004. *Front Loading the buidling design process for environmental benefits.* Queensland, s.n.

Watson, S., Cheshire, W. & Hyde, D. R., 2000. *A holistic environmental Brief: development and Application.* Cambridge, James and James, pp. 791-792.

Williams, K., 2003. *Can urban Intensification Contribute to Sustainable cities? An International Perspective,* Oxford: Oxford Centre for Sustainable development.

Williams, N. J., 1993. Homeownership and the Sale of Public-Sector Housing in Great Britain. In: *Ownership, Control, and the Future of Housing Policy.* London: Greenwood Press, pp. 121-137.

Williams & Stevenson, 2000. s.l.:s.n.

Wilson, M., Walker, J. H., Santamouris, M. & Jaure, S., 1998. *The Design Process for Energy Efficient New and refurbished housing for EC themed Sunshine projects.* Lisbon, James and James, pp. 663-666.

Windapo, A. O. & Rotimi, J. O., 2012. Contemporary issues in building collapse and its implications for sustainable development. *Buildings,* pp. 283-299.

World Bank, 1992. *World Development report 1992: Development and the Environment,* New York: Oxford University Press.

World Health Organisation, 2014. *World Health Statistics 2014,* Geneva: World Health Press.

Yagboyaju, D. A., 2010. *The state and governance crisis in Nigeria.* Ibadan: College press .

Yin, R. K., 2002. *Case Study Research, Design and Methods.* 3rd ed. Newbury Park: Sage Publications.

Yudelson, J., 2007. *Green Building through Integrated Design.* New York: McGraw Hill.

APPENDIX A

AIM

To analyze the sustainability impact of design and technology on affordable housing production in Lagos

1. **QUESTION 1- How can design and technology drive affordable sustainable construction from inception to completion?**

USING SUSTAINABILITY INDICATOR QUESTIONS AS BELOW:

1. DAY LIGHTING
2. CROSS VENTILATION
3. DRAINAGE + PLUMBING
4. ACCESS TO SAFE WATER
5. SUFFICIENT LIVING SPACE
6. GOOD SANITATION
7. GOOD HEALTHY ENVIRONMENT
8. BUILDING MATERIALS USED
9. SPACE PLANNING AND LAYOUT
10. POWER GENERATION - Mains
11. POWER GENERATION - Generator

2. **QUESTION 2 - How can we speed up knowledge transfer to developers and artisans**

USING IMPROVEMENT QUESTIONS AS BELOW:

1. Adequate and appropriate housing, town planning efforts
2. Infrastructure provision in various parts of Lagos
3. Water (rivers, lagoon) pollution from debris and waste dischar
4. Enforcing occupancy and building use
5. Conditions of the roads and transportation
6. Training of Home Construction workers
7. Conditions of the street drains and accumulation of filth
8. Energy savings/conservation and the impact on the environme
9. The creation of places that are attractive e.g. parks etc.

HYPOTHESIS

- *With climate change and new policies, we can't equally provide affordable housing and it's not fair to expect the same standards in a developing country like Nigeria as in developed countries.*

AFFORDABILTY

1. The cost of living
2. Cost of building houses
3. Can the management do a better job
4. Financing housing development
5. Home loans for prospective home owners
6. How affordable do you think a property like this is for a newly married couple

PROPERTY DETAILS

1. Bungalow
2. Flats
3. Houses
4. Are you the Home owner
5. Are you Renting
6. Are you Living with others
7. How many people live in this house

APPENDIX B

	Design and technology and its sustainability impact on affordable housing production in Nigeria					
	Personal Information - Please tick the appropriate boxes to the following questions.					
A	**Gender**					
	Male					
	Female					
B	**Marital Status**					
	Single					
	Married					
	Separated/Divorced					
	Widowed					
C	**Occupation**					
	Student (Tertiary Institution)					
	Teaching					
	Engineering, Architecture, Surveying, Building					
	Administration, Marketing, Legal, Accounting, Finance, etc					
	Health Care, etc.					
	Manufacturing, etc.					
	Other					
D	**Age**					
	15 - 35					
	36 - 55					
	56 and above					
E	How will you rate your knowledge of the following issues					
	Housing Provision Issues -*(policy and sustainability perception)*	**NO IDEA**	**SOME WHAT AWARE**	**VERY AWARE**		
1	Lagos state Government Housing Policy					
2	Housing provision in various parts of					

	Lagos					
3	Design and technology of buildings					
4	Renewable energy					
F	**How would you rate the Lagos state government policies on the following - *(The government's construction know-how)***	**GOOD**	**NOT GOOD**	**DON'T KNOW**		
1	Rural -urban migration alleviation					
2	Infastructure development					
3	Low cost housing production					
4	Utilising Sustainable building materials					
5	Land use decree					
6	Financing housing development					
7	Home loans for home owners					
8	Building Code use					
9	Public Information					
10	New building technology					
G	**What has been your major source of information of the issues mentioned above? Please tick as many as appropriate - *(Inhabitants awareness)***					
1	Local Journals, Newspapers and Magazines					
2	International Journals, Newspapers and Magazines					
3	Local Radio and Television Stations					
4	International Radio and Television Stations					
5	Educational and professional books/publications					
6	Legislation and codes of practice					
H	**Please tick the appropriate box that best expresses your opinion of the statements indicated in the table below**					
	Buildings and its environmental impact	**NO**	**DON'T KNOW**	**YES**		

1	Buildings are the single largest contributor to global warming					
2	Buildings are responsible for over half of all energy consumption					
3	Architects have a major part to play in ensuring good housing policy					
4	Establishing a construction bank would help					
5	Review of Land use decree 1978 will increase access to land					
6	A better mix of housing is required					
7	Are we still influenced by colonial design					
I	**Government Policy Impact**	**NO**	**DON'T KNOW**	**YES**		
1	Can research and development of local materials help to provide more sustainable housing					
2	Is there a need for better management of public resources in the implementation of infastructure					
3	Is there a need for better environment for growth and employment generation					
4	Are government plans well articulated					
5	Are there indigenous solutions for the housing deficit					
6	Is there a need for change in town planning approval process					
7	Do you believe that government housing being provided now is affordable					
8	Can we get sustainable affordable housing for less than 2 million Naira in Lagos					
9	Can we speed up knowledge transfer to developers and artisans					
10	Is there a need for better local cooperation and community spirit					
J	**We each have different outlooks to life and issues and these affect our actions and behaviours. Please indicate to what extent the following statements describe or relate to you.**					

	Values, attitudes and actions	strongly disagree	disagree	uncertain or indifferent	agree	strongly agree
1	Is there a need for demolition of old housing stock					
2	Is new build of different types a better option					
3	Decrease of slums in Lagos is evidence that present policies are achieving objectives					
4	Millenium development goals are important for the nations development					
5	I will ensure my house is built with sustainable materials					
6	Generous tax credits and regulatory incentives would help housing development					
7	Short term and overly complex public policies with limited effects on the profitability of investment projects are unlikely to attract private financial flows					
8	Other issues are more important than housing such as primary healthcare, gender equality, water, sanitation and Aids					
9	Good housing infastructure would alleviate these issues such as water provision, sanitation and better healthcare					
10	Continued land development is a good idea as long as a high quality of life can be preserved					
K	**There are a number of social, economic and environmental issues that face Lagos as a sustainable and vibrant city. Please tick what you believe are the 5 most important issues that the government and the people should be concerned with. Please tick only 5 items - (Direct Environmental issues pertaining to Lagos)**					
1	Water (rivers, lagoon) pollution from debris and waste discharges					

2	Air pollution from dust and fumes from trucks and buses					
3	Climate change, global warming and their predicted consequences					
4	Conditions of the roads and transportation					
5	Power Generation for the home					
6	Conditions of the street drains and accumulation of filth					
7	The state of the economy, job creation and the cost of living					
8	Corruption in government and thuggery by area gangs					
9	Adequate and appropriate housing, town planning efforts					
10	Flooding (following heavy rains) and ocean surge (bar beach)					
11	Security and safety of lives and properties					
12	Energy savings/conservation and the impact on the environment					
13	The increasing population and adequacy of structural infrastructure					
14	Ensuring mainstream policies really work for the poorest neighbourhoods					
15	Making a long-term commitment with sustained political priority					
16	The creation of places that are attractive to live and work in					
17	Improved walkability and the design of mixed use pedestrian friendly streets					
18	Community involvement and ownership					
	THANK YOU VERY MUCH FOR YOUR ASSISTANCE					
..						

APPENDIX C

		Purpose of this survey is to analyse the sustainability impact of design and technology on affordable housing production in Lagos state.					
		How satisfied are you with the following in your home.	**Not Satisfied**	**Satisfied**	**Very Satisfied**		
A		**Sustainability Indicator**					
1		DAY LIGHTING					
2		CROSS VENTILATION					
3		DRAINAGE + PLUMBING					
4		ACCESS TO SAFE WATER					
5		SUFFICIENT LIVING SPACE					
6		GOOD SANITATION					
7		GOOD HEALTHY ENVIRONMENT					
8		BUILDING MATERIALS USED					
9		SPACE PLANNING AND LAYOUT					
10		POWER GENERATION - Mains					
11		POWER GENERATION - Generator					
12		POWER GENERATION - Inverter					
		How would you rate the Lagos state government performance in the following areas *(1=poor; 2=fair; 3=good; 4=very good; 5=excellent)*	**1**	**2**	**3**	**4**	**5**
B		**Improvement**					
1		Adequate and appropriate housing and town planning efforts					
2		Infrastructure provision in various parts of Lagos					
3		Water (rivers, lagoon) pollution from debris and waste discharges					
4		Enforcing occupancy and building use					
5		Conditions of the roads and transportation					
6		Training of Home Construction workers					
7		Conditions of the street drains and accumulation of filth					
8		Energy savings/conservation and the impact on the environment					
9		The creation of places that are attractive e.g. parks etc.					
		How would you rate the Lagos state government performance in the following areas *(1=poor; 2=fair; 3=good; 4=very good; 5=excellent)*	**1**	**2**	**3**	**4**	**5**
C		**Affordability**					
1		The cost of living					
2		Cost of building houses					
3		Property management of their estates					
4		Financing of housing development					
5		Home loans for prospective home owners					
6		Affordability of a property like this for say a newly married couple					
D		**Property details**					
1		Bungalow					
2		Flats					
3		Duplex					
4		Are you the Home owner					
5		Are you Renting					
6		Are you Living with others					
7		How many people live in this house					
8		How many bedrooms in this house					
E		**Gender**					
1		Male					
2		Female					
F		**Occupation**					
1		Student (Tertiary Institution)					
2		Unemployed					
3		Employed					
4		Retired					
G		**Age**					
1		Young Adult (18-30)					
2		Adult (31-45)					
3		Middle aged (46-60)					
4		Elderly (61 and above)					
H		**Note**					
1		Please note Main Interviewee					
2		No. of People interviewed in one household					

APPENDIX D

Pilot Interview Questions:

Research Topic:

THE DEVELOPMENT OF A FRAMEWORK FOR SUSTAINABLE HOUSING DELIVERY IN LAGOS, NIGERIA

No.	ITEM	RESPONSE
1	Buildings are the single largest contributor t Global warming - Please Comment	
2	Buildings are responsible for over half of all energ consumption- Please Comment	
3	Architects can aid the development of a green tomorrow as 80% of the sustainable design decisions that affect a buildings energy performance are made by architects at the design phase. - Please Comment	
4	Do you evaluate the energy performance of a building at the early stages of designing building process- Please Comment	

5 There is a code for sustainable homes in the UK for example, do we have anything like that here in Lagos State- Please Comment

6 Establishment of a construction bank is essential - Please Comment

7 Evolution of a simpler form of design is key - Please Comment

8 Review of land use decree of 1976 increased access to land- Please Comment

9 How do you rate the environmental impact of buildings?

10 Reducing operating costs is important - Please Comment

11 Improving occupants health is ideal- Please Comment

12 Reducing the impact on the environment is crucial - Please Comment

13 How do you aim to be ‘greener’ or more environmentally responsible?

14 Why did the LSDPC breakaway?

15 What would you say is the ideal model for affordable housing creation?

16 What local materials would you suggest we can use?

17 What about laterite brick production?

18 What about clay bricks production?

19 What about timber production?

20 Do we have any alternatives?

21 The housing minister is quoted as saying there is a housing shortfall of 16 million in the country. Do you think this is true?

22 What is the housing shortfall in Lagos?

23 How is the housing department alleviating this shortfall?

24 How many units were created in the last 12 or 24 months by the housing department?

25 What developments are in the pipeline?

26 A better mix of housing is required?

27 Are the units affordable?

28 Is production cost effective to ensure volumetric?

29 What are the constraints – budgetary?

30 Are there any partnerships envisaged in order to increase or improve production?

31 What are the problems identified?

32 Is there a structure for the roadmap and housing strategy?

33 What are the effects of the government intervention in the housing sector?

34 Is there a possibility for a multi-stakeholder cooperation for the formation of housing policy framework and alternatives as well as a strategy towards housing policy development and implementation?

35 Code for sustainable homes launched in 2007 uses a design stage report a post construction report performance in 9 key areas = energy and CO2 emissions, water, materials, surface water run-off, waste, pollution, health and well being management and ecology- Please Comment

36 Lagos State carbon credit awareness campaign - A strategic concept for enhancing sustainable national development and poverty reduction in Nigeria- Please Comment

37 Renewable energy like - Hydro, solar, wind is key - Please Comment

38 Prefab use is key - Please Comment

APPENDIX E

Interview Questions:
Research topic:

THE DEVELOPMENT OF A FRAMEWORK FOR SUSTAINABLE HOUSING DELIVERY IN LAGOS NIGERIA-

No.	ITEM	RESPONSE
1.	Buildings are the single largest contributor to Global warming-Please comment	Yes- The emissions from buildings add immensely, so designers need to ensure best climatic design.
2.	Buildings are responsible for over half of all energy consumption- Please comment	Yes- Generators in every household makes consumption even higher
3.	Architects can aid the development of a green tomorrow as 80% of the sustainable design decisions that affects a building energy performance are made by architects at the design phase- Please comment	Yes- The architecture is fundamental in reducing energy consumption as architects are 1st on the job and visualise it so its important to design appropriately.
4.	Do you evaluate the energy performance of a building at the early stages of designing building process- Please comment	No- Unfortunately its not done appropriately before site analysis is done. Sun location and building orientation is analyzed.
5.	There is a code for sustainable homes in the UK for example, do we have anything like that here in Lagos state. Please comment	No- We need to create a benchmark for assessment that suits the local terrain.
6.	Establishment of a construction bank is essential Please comment	Yes- More affordable tailored funds for construction
7.	Evolution of a simpler form of design is key- Please comment	Yes- Which will be easier to build and ensure good light and ventilation
8.	Review of land use decree of 1979 increased access to Land- Please comment	Yes- Also brought rapid uncontrolled development.
9.	How do you rate the environmental impact of buildings- Please comment	We don't do it in a systematic manner and its becoming detrimental development.
10.	Reducing operating cost is important- Please comment	Yes- Building design, its orientation
11.	Improving occupants health is ideal- Please comment	Good design and proper infrastructure like water, power, drainage, green spaces will improve health of occupants
12.	Reducing the impact on the environment is crucial- Please comment	To stay the detrimental effect and turn it into a positive one.
13.	How do you aim to be greener or more environmentally responsible	Using local materials e.g. red brick, timber reduction of transport costs.

14.	Why did the LSDPC breakaway	To generate profit for government.
15.	What would you say is your ideal model for affordable housing creation	Standardization of Design, More stakeholders involvement, good transfer of skills to artisans to reduce building costs
16.	What local materials would you suggest we can use	Brick, timber, local stone and marble
17.	What about laterite brick production	Good, but needs more production
18.	What about clay bricks production	Good, but needs more production
19.	What about timber production	Good but needs more and better production
20.	Do we have any alternatives	Not many, but have laterite thatch
21.	The housing minister is quoted as saying there is a housing shortfall of 16millionin the country. Do you think this is true?	Yes it is, maybe more now as 16millionis only 10% of the present population
22.	What is the housing shortfall in Lagos	Over 1m
23.	How is the housing department alleviating this shortfall	Trying to build more housing estates and partnering with local developers and contractors. Also introducing the mortgage scheme to alleviate the cost of construction.
24.	How many units were created in the last 12 or 24 months by the housing department	Approx. 2000 units.
25.	What developments are in the pipelines	Abijo, etc..
26.	A better mix of housing is required	Yes, commencing a mix of 1/2/3 bed per floor.
27.	Are the units affordable	With the mortgage scheme the prices become more affordable
28.	Is production cost effective to ensure volumetric	Work is in progress to do this
29.	What are the constraints-budgetary	The budgetary allocation is inadequate. Good partners to develop, better housing policy
30.	Are there any partnerships envisaged in order to increase or improve production	Yes- Ongoing with private developers and contractors.
31.	What are the problems identified	Infrastructure, cost of materials and finance.
32.	Is there a structure for the road map and housing strategy	Yes- Mortgage financing, partnering with stakeholders
33.	What are the effects of the government intervention in the housing sector	Housing estates, partnering to ease developers burden, relaxing planning laws.
34.	Is there a possibility of a multi- stakeholder	Yes- Housing policy being

	Cooperation of the formation of housing policy framework and alternatives as well as a strategy towards housing policy development and implementation	developed, planning development guidelines review.
35.	Code for sustainable homes launched in 2007 uses a design stage report, a post construction report performance in 9 key areas= energy and CO2 emissions, water, materials, surface water run-off, waste pollution, health and well being management and ecology. Please comment	The Nigerian National Building code is what is being used
36.	Lagos state carbon credit awareness campaign- A strategic concept for enhancing sustainable national development and poverty reduction in Nigeria- Please comment	Yes- to make indigenes aware and ensure future sustainable development.
37.	Renewable energy like- Hydro, solar, wind is key- Please comment	Solar has been done in areas of the state for street lighting. Initial capital cost is an issue.
38.	Prefab use is key- Please comment	Yes- This is being encouraged with developers e.g Dolphin estate.

APPENDIX F

Executive Summary

- Over the past four years, the provision of housing units in the state has generated employment amongst other benefits. This has in turn improved quality of life.

- Most of the housing units have not yet been sold. This is supported by a 66% reduction in the number of units sold. These houses are being reserved for the mortgage scheme policy where income earners can have the opportunity to own house.

- There was a reduction in the number of Certificate of Ownership (C of O) approved in 2008. In 2009, the number of C of O approved increased by 33% relative to 2008 (Delegation of Commissioners as signatories)

- This a relative effect on the number of governors consent grant for subsequent transactions. While there was a slight reduction in 2010 relative to 2009 by 2.6%

Executive Summary

The land bureau generated 111.5% more in revenue relative to 2007 and a slight decrease in 2010 by 11.05% relative to 2009. The bulk of this money was paid out in compensation to people whose lands were acquired by the government.

Also the land owners have been compensated but sometimes that is not a good enough consolation as the land would add more value and is a growing asset.

The compensation paid to communities and families whose lands were acquired for public interest has decreased by 0.3% over the past four years.

This expense made, affords the state the opportunity to provide good road. Amongst is the Lekki –Epe expressway. This in turn would lead to urban regeneration. The acquisition of land allows a good regeneration of the environment to be developed properly in line with town planning guidelines. The problem previously was that the developmental plan was not concise and land that encroached on the developmental plan was left as is. Now the government is proactive and would not tolerate such land unlike before.

The provision of housing and communities amenities will in turn increase the level of social and economic activities; leading to a higher level of productivity and contribution to the GDP of Nigeria. The amenities are a catalyst for better way of life a better standard of living for the populace.

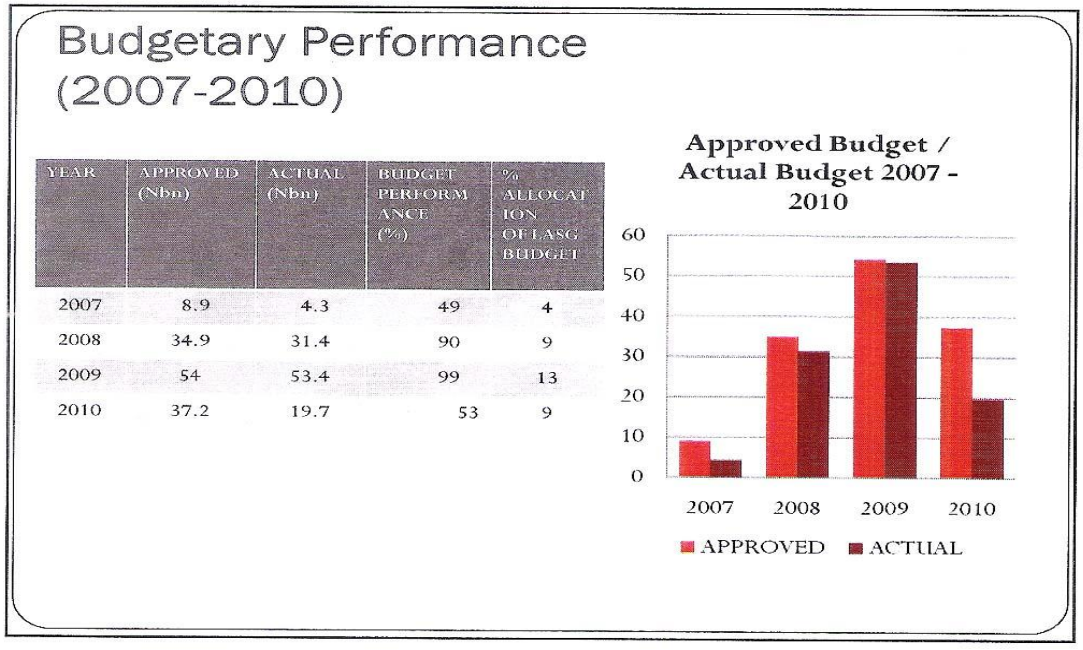


Figure 7.1: Budgetary performance 2007-2010

Methodology

1. Choice of KPIs based on strategic significance (e.g. expenditure, socioeconomic significance and interdependencies).
   The key performance indicators used were for example disbursements and payments. This helped to assess the importance as monies expended proved to be a reliable marker to weigh against actual achievement. The social and economic significance was also measured by assessing the structures and attributes dependent on it.

2. Trend analysis conducted using routine survey and audit data.
3. The style and study is completed with the help of questionnaires, case studies and existing information. Extrapolation/inference factors and predictive values derived from academic and policy literature. As information is not always readily available from either the ministries or the institutions there is a need to make deductions and conclusions based on literature, interviews with people, case studies and observations.

Housing and community

Amenities

Executive Summary8 | Methodology | Housing Sector Analysis | Conclusion | Recommendation

Impact Analysis

Unfortunately, the housing provided at Igbogbo has proved not to be as economic as was hoped on the onset. The cost of construction of the buildings and the necessary infrastructure has made the development overpriced for the area

The provision of external infrastructure is critical to the proper development of any areas especially the new estates being built by the government.

The ongoing estates are being completed and the issue of uncompleted projects is now mainly a thing of the past as most projects are being pushed through to completion due to the monitoring procedures and the renewed vigour to complete projects in line with the government policy.

Impact Channels

Provision of economic housing unit at Igbogbo

Reconstruction of part of Abraham Adesanya Housing Estate, Ajah

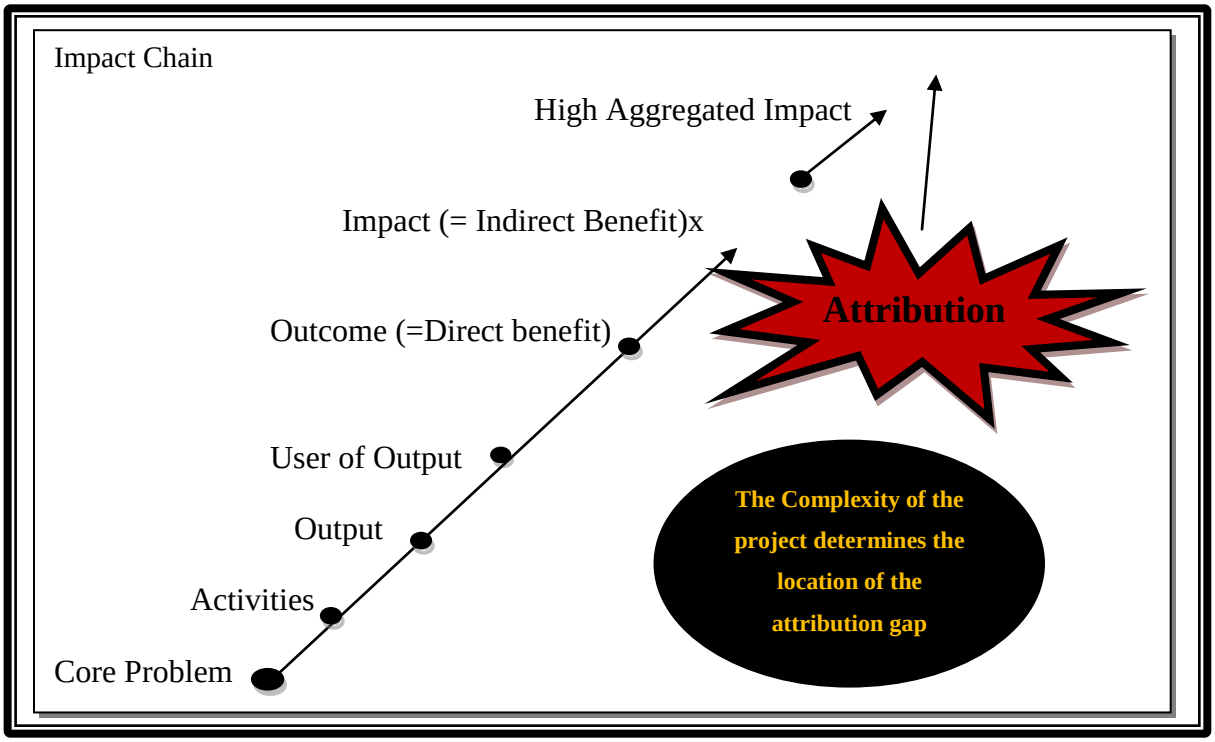
Provision of infrastructure (road, external electrification and water)

Completion of ongoing housing estate at Odoragushin, Gbagada, Ikeja, Ojokoro and Iloro (Agege)

The IBA new town development scheme and Cortex Ikota (PPP)

N40 billion mortgage scheme (30% up front and the balance payment in a period of 10 years with 10% interest rate per annum) being worked out with some banks.

A report on spotlight on Lagos Housing development 2014 outlook released by residential auctions company (RAC) claim that supply of new housing stock in Lagos has grown steadily over the last five years and estimate that no fewer than 7,000 units have been delivered over this period. The report also disclosed that the reluctance of buyers to take up mortgage finance can be attributed to several consequential factors that include but not limited to the excessive interest rates being charged by the local financial institutions, low amortization period, management fees and other annual charges. Typical interest rates often range from 19-24% per annum depending on the institution and risk profile. While management fees range from 4% to 5% per annum, front-end loaded. Amortization periods often range from 5 yrs to 10 yrs as opposed to 20 -25yrs that is the common practice in most standard markets.(Uwaegbulam, 2014)



Housing

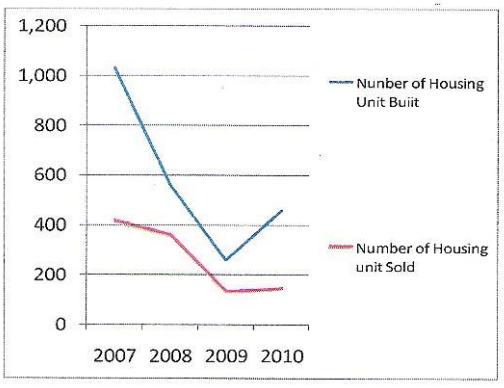
The number of housing units has been reduced to allow the government have sufficient units available for sale in the public sale exercise. Housing units take approximately six months to build and this would **need** to be factored into the program for sale of units to members of the public. They are anxious to partake and sceptical about the whole exercise. A convincing few auctions initially will soon eradicate the doubters and an influx of willing and overly enthusiastic buyers will soon come on board.

Cities all over Nigeria are growing at an alarming rate, with huge housing requirements exacerbated by the need and desire of rural inhabitants to make a better life in the city. This growth and physical expansion of cities have been accompanied by unplanned urban sprawl, environmental pollution, deterioration, deficiencies in modern basic facilities, and general urban decay. As increased poverty and urbanization exert more pressures on urban facilities, most Nigerian cities tend to have lost their original dignity, social cohesion and administrative efficiency. (Aluko, 2011)Contemporary West African cities characterized by poor housing, water, sanitation, and public health infrastructure. The Lagos metropolis in particular is the epitome of urban decay. With over 100 blighted communities and a poverty level of over 50%, the city is replete with environmental problems ranging from slums and squatter settlements, through transportation and infrastructure problems, to low productivity, crime and delinquency. (UN-Habitat/Lagos State Government, 2004).

Housing KPIs

INTERPENDENT KPIs	2007	2008	2009	2010
Title document (Sub-lease)	0	0	0	73
Number of Community facilities e.g Mini water works, post, primary Health Centre	2	0	1	2
Number of Markets Constructed/Rehabilitated	0	0	0	1
Number of Government Estates Renovated	2	5	8	1
Number of Satellite Towns Developed	0	0	0	0
Average cost of rent for 2 & 3 bed apartments in high density areas	150,000	200,000	250,000	500,000
Average cost of rent for 2 & 3 bed apartments in medium density areas	650,000	700,000	750,000	1,000,000
Number of housing units built	1028	560	256	456
Number of Housing Estates Built	4	NIL	1	4
Number of persons working in the housing/estates sector	6640	1900	5937	2550
Number of Housing unit sold	413	355	126	140

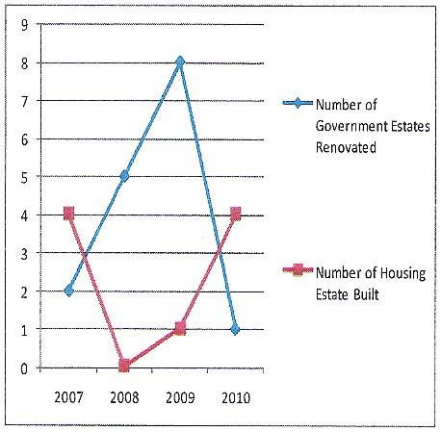
Housing Trend Analysis I



There is a downward trend for the houses sold over the period 2007 to 2009 but a slight increase by 11.1% in 2010.
The mortgage scheme being set in place for the low income earners is the major reason why houses are not sold. The kick off of the mortgage scheme would increase the revenue made and provide flexibility for 1st buyers, and the impact will be realized.

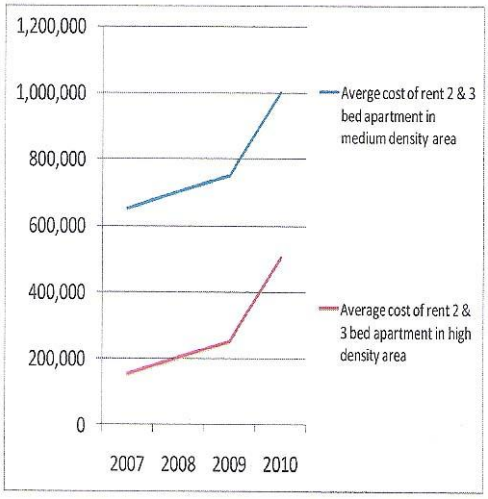
- Although there is a reduction in the provision of housing units over the period 2007 to 2010:
- It still served as a means of job creation for youths as there is 5937 jobs were created between 2007 and 2009, accounting for a 212% increase, and 57.04% decrease in year 2010
- Giving approximately 5937 in 2009 families disposable income and increasing their wellbeing, and has indirectly contributed to the positive increase in the life expectancy rate which has gone up from 48 years to 68.5 year (2007-2010).

Housing Trend Analysis II



- Improve the quality of life as there is increase disposable income for youth paid by contractors
- Reduction in crime rate as there are more jobs available for youths
- Increased communities activities e.g. corner shops
- Demolished hideouts and slums at (Abraham Adesanya housing estates)

Housing Trend Analysis III



- High aggregated impact in the long term will be flexibility for low income earners (collateral and assets) and 1st time buyers to own their own houses, and increase their standard of living.

Impact of Ojokoro housing units

- Ojokoro housing units(During)

- Ojokoro housing units (completed)

The housing unit provided in the Ojokoro area has led to

- Improved safety of neighbouring areas as the project has eliminated social miscreant from the area.
- It has also created 510 jobs for the people and additional development .
- Increase in housing stock of the State.
- It would increase economic activity in the area when the houses are sold as when bought owners can renovate , attract corner stores etc

In the long run 5yrs -10yrs about 80 families should own houses as the ministry plans to provide for the low income families with the mortgage scheme in place. This would provide flexibility for 1st time buyers to own property

- vailability of title documents which would serve as collateral to the banks for new business transactions
- Incentive for employment
- Increase in confidence In State projects

Impact of Odoragunsin Housing Units

During

Completed

Impact of Odoragunsin Housing Units

This jubilee scheme has translated to:

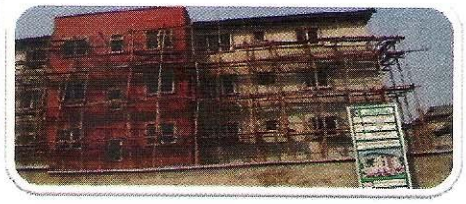
- Provision of about 1000 jobs for the people in the area. More disposable income for the community and improved well being and empowerment.
- Opening up of the entire area to further development, with the provision of good water, electricity, road.- better standard of living, provision of improved sales through electricity, ease of passage in the community.
- There would be an increased level of economic activity
- Availability of affordable accommodation for the people. This is achievable as the units are 1/2 bedroom
- Additional community benefits and the infrastructure constructed have not be added to the housing cost.

Long term Impact: (in 5yrs and beyond)

- Improved business activities i.e. corner shops, trading etc
- 336 low income families would own houses
- Urban regeneration as Epe is provided with electricity access to good water this would spill over to improved health and life expectancy rate of the community.

Impact of Iloro Agege housing units

- Iloro Agege(During)



Iloro Agege(Completed)

BASELINE SITUATION:

The land was previously used as a football field by the youths, but was discovered later that some hoodlums used the open fields as a hide out where they smoked hemps and engaged in other vices .This lead to the conversion of the field to a housing estate by the State Government.

This in turn has lead to

- The social amenities provided and the completion of the estates
- which will lead to an increase in land value
- attraction of neighbouring buildings being rebuilt or renovated.
- Provision of 300 jobs for the people.
- improved security and safety in the area as the eradication of the hideout of hoodlums.

Long term Impact

- Provisions of homes for 32 low income families/shelter
- Communities activities as corner shops,
- Increases disposable income
- Improved business activities.

Impact of Chois Abijo housing units

Chois Abijo (PPP Initiative)

- The administration of public – private – partnership has not only served as a means of job creation in the State. It has also led to
- Beautification of the area
- Greater hygiene, reduction in illness
- Tourist attraction
- Trust in Government
- Economic development as there is an increased provision of good water, electricity, roads there would in turn increase economic activity

Impact of Chois Abijo housing units

Long term

- It would provide 1000 families with affordable homes
- 1st time buyers
- Encourages unity in families
- Take Kids off the streets
- Collateral for borrowing
- Increased assets
- Increase in economic activities
- Reduction in the number of homeless people
- Increase the life expectancy

IMPACT SIZE

Facts and Assumptions

- Assumption: 5 people in a family or household
- Fact: 2550 jobs due to intervention
- Fact: Ojokoro shelter for 80 low income families
- Fact: Odoragunsin shelter for 336 low income families
- Fact: IloroAgege shelter for 32 low income families
- Fact: 2,550 are expected not to commit crimes

Impact Multiplier Effect

- Assumption: 5 people in a family
- 2550*5 = 6,375 (feed 12,750mouths)
- In Ojokoro house shelter for = 80*5 = 400 low income people will be sheltered
- Youth more likely to tell their friends
- Assumption: 1 tells 2 people
- 2,550*2 = 5,100 youths will be seeking employment.
- Recommendation = supply of Jobs

Socio – Economic Impact of Housing

Baseline Scenario	Benefit to local community	Economic impact	Social impact	Environmental impact	Predicted Impact
Land **Housing Units(outcome)**	Shelter Employment Trading activities Improved urban life Accessibility to water electricity And municipal facilities	➢ Increase in employment rate ➢ Increase in revenue through tax (property) ➢ Creation of economic hubs in the state ➢ Foreign Direct investment as there are more properties ➢ Increase in housing stock ➢ Increased economic assets for buyers	➢ Quality of life ➢ Reduction in the cluster of some areas in the state ➢ Reduced crime rate. ➢ Improved education ➢ Reduction in hideouts of hoodlums: this in turn would lead to improved security and safety in the state. ➢ Improved social status ➢ Social empowerment	➢ Possible increase in land value ➢ Beautification ➢ Increase in the concern on environment issues in the local community and state ➢ Cleanliness which would reduce health related issues and spill over to the reduction in the number	Affordable mass housing scheme when the mortgages scheme begins Reduces congestion in some areas of the state which in turn reduces travel time and greater accessibility Increase in property assets Economic activities Attraction for franchise business

Impact of Odoragunsin Housing Units

Recommendation Targets For Lagos State and City comparison									
1	**Cities**	LAGOS	New York	London	Accra	Cairo	Johannesburg	Oslo	Singapore
2	**Population**	18,000,000	18,900,000	7,556,900	3,734,736	7,749,661	3,888,180	577,647	4,424,133
3	**Percentage of Homeless People**	24.4%	20%	15%			20%	18%	20%
	No of Industrial Scheme developed								

Land Bureau

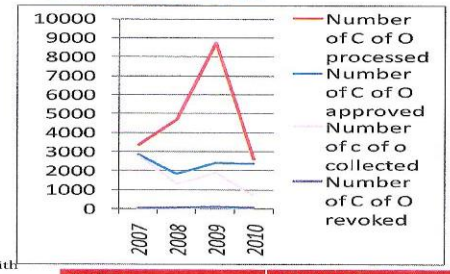
Land Bureau KPIs

KPIs	2007	2008	2009	2010
No.s of people compensated for acquired lands	3537	1881	2999	27
Compensation paid	₦211,560,895	262,291,640	N1,347,155,647	683,287,730.00
Number of consent granted	2930	2803	3806	5920A
Number of C of O processed	3313	4644	8682	2553
Number of C of O approved	2824	1795	2402	2341
Number of c of o collected	2760	1254	1837	647
Number of C of O revoked	2	29	80	15
Number of Industrial scheme developed	1022	1890	1896	Nil
Number of hectares of land acquired for state purpose	29413	15085.344	15085.344	15085.344
Number of People allotted Government Land	24283	35842	37844	38144

LAND BUREAU ANALYSIS

PERCEPTION OF NO OF PEOPLE COMPENSATED AND THE AMOUNT PAID

PERCEPTION OF C of O's



Governor's consent documents is granted to individuals with c of o and other title documents for subsequent transaction,

- positive trend between 2007-2010.
- it also shows a ratio of 2:3 of c of o approved to consent granted.
- Processing time for C of O.

Before	2009/10
Up to 6 months Delegation of signatory to Commissioners	3-4 weeks subject to complete documentation

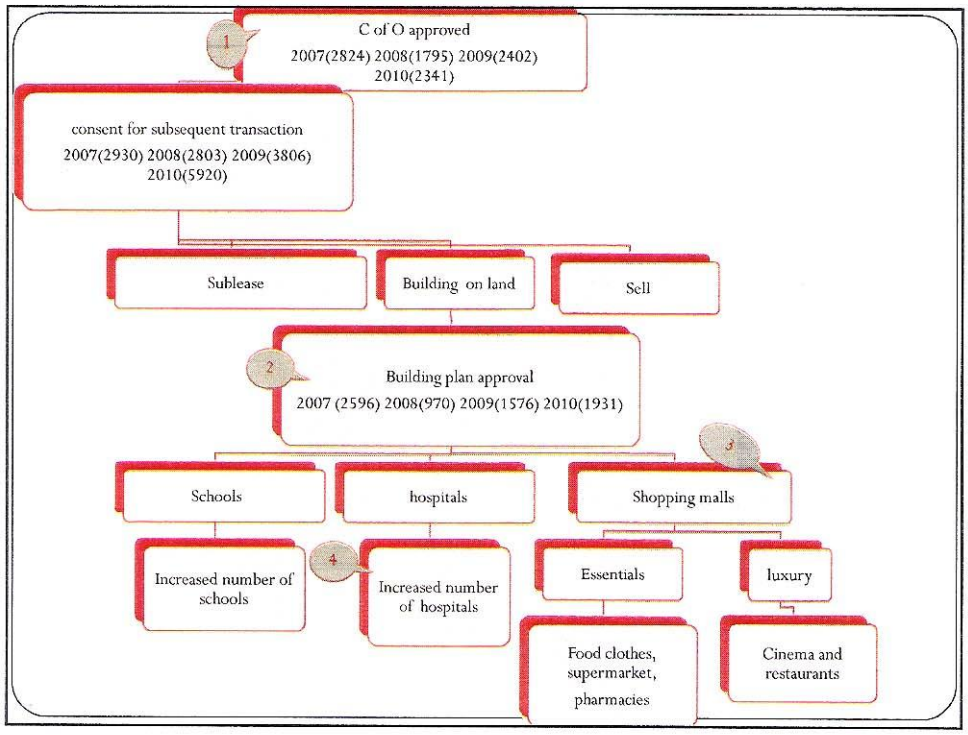
Perception of C of O and Consent

This implies that more C of O are being used to create economic hubs:

- Sub lease of land
- Enhancing borrowing/ selling
- Building on the land which would in turn lead to:
  - Increasing number of houses, shopping centres, hospitals schools.
  - This increase could be attributed to improved accessibility for local communities to commodities such as Food, health centres and educational centres, thus improved quality of life, healthier people and increased literacy rate as an indirect spillover over effect.
  - Mortgages which allows ownership of house, and increases personal and company assets.
  - Revenue is generated for the State as there are consents fees, property tax, fees on the C of O

Compensation paid to communities translates to

- A reduction in displacement
- The state is being responsible
- A reduction in land related cases in the civil court
- Provision of land to provide roads, drainage beautification to enhance the economy as a whole
- Attract investment both locally and internationally
- Increasing faith in the Government



Analysis

C of O approved
2007(2824) 2008(1795) 2009(2402)
2010(2341)

Increase in the number of C of O's approved, consent fees => increased revenue for the state

Building plan approval
2007 (2596) 2008(970) 2009(1576) 2010(1931)

The land bureau generated revenue are N 8.79 billion(2007), N17.35 billion (2008), N 18. 55 billion (2009) and N16.5billon (2010)

- Unlock the capital in the assets, this would allow owners to sublease the land, serve as collateral for loans or any type of investment.
- Reduces the number of land related cases in the civil court

Impact Analysis

Baseline scenario	Benefit to the community	Economic impact	Social impact	Environmental impact	Predicted impact
C of O approved	Sense of ownership	Unlocks the capital to the assets.	Reduction in the number of land cases in the civil court social empowerment Minimizes conflict	Beautification Sense of concern about environment issues	Electronic C of O would reduce process time, fraud and crime rate
Consent granted		Increased economic activities	Growth for the population/fight disease Multiplier effect birth of healthy babies into the State		Increased investment which would in turn increase tax for the state
Compensation		Increased economic activities	Reduction in civil case Avoidance of	Beautification Sanitation	Improved quality of life Economic

HCA's Financial Snapshot

LAND BUREAU	
Total Budget (2009-2010)	8,096,487,640
Total Revenue 2010	16.5 BILLION
Compensation fee 2010 2009	 683,287,730 MILLION 1,347,155,647 BILLION

Physical Planning and Urban Development KPIs

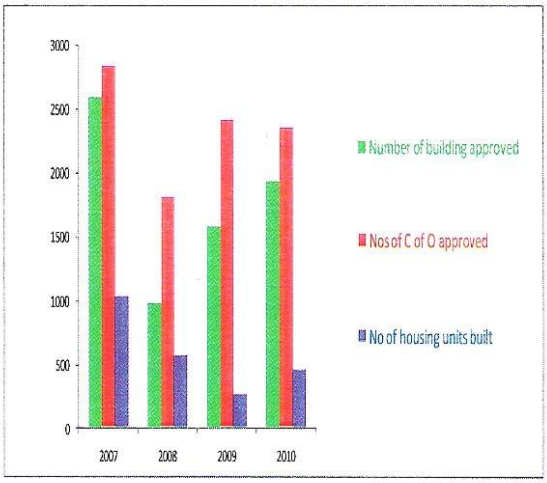
PHYSICAL PLANNING AND URBAN DEVELOPMENT KPI's

Objective	KPIs	2007	2008	2009	2010
Promotion of systematic physical planning for sustainable development	Number of building plan submitted	4416	2445	2519	2840
	Number of buildings approved	2596	970	1576	1931
	Number of layout plan submitted	17	16	33	14
	Number of approved layout plan granted	2	7	9	8
Pursuit of urban upgrading	Number of illegal	19513	8595	6671	7393
	Number of illegal structures demolished	1933	348	244	126
	% of illegal structures demolished	9.91%s	4.05%	3.68%	2.19%

Over the period 2007 – 2010 there has been an increase number of approved of C of O.

This in turn affects the number of buildings approved. It also serve as a mean to unlock the capital and assets, empowerment (power of attorney)

Increase in building plans would lead to Freedom of trade, tourism and FDI, increasing economic activity, stabilising and Increasing the money circulation



Rural Development

Rural Development - A

Interdependent KPI's	2007	2008	2009	2010
Number of rural roads contracted	2	9	3	6
Number of rural roads rehabilitated	3	14	-	-
Number of jetties constructed	2	6	13	-
Number of jetties rehabilitated	-	4	-	-
Number of Health Centre's Constructed	-	10	-	-
No of communities provided with rural water	23	142	194	28
No of communities provided with rural electrification	9	42	67	2
Number of VIP Pit Latrines Provided	2	5	-	2
Number of Solar Powered communal toiled	-	-	1	2
Number of people empowered (Fish Farming)	138	2049	639	-

Rural Development - B

Interdependent KPI's	2007	2008	2009	2010
Number of generator	-	-	90	10
Number of Neighborhood	-	10	7	4
Number of People Employed as Neighborhood watch officers	4,027	4,052	4,110	-
Number of Transformers Supplied to Communities	48	55	200	100
Number of Solar Project	19	-	100	-
Number of Town Hall Constructed	-	8	4	-
Number of people empowered (Crops)	114	1473	1128	-
Number of people empowered (Livestock)	205	698	508	-
Number of rural Housing Constructed	4	-	-	-
Number of Latrine beneficiaries Schemed	-	-	239	80

Impact Of Drainage Construction In Irewunmi Adebanjo Ikorodu

OUTCOME

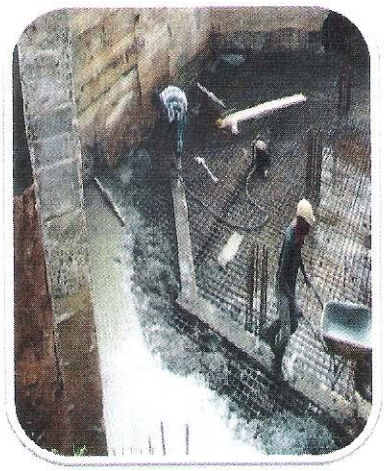
- Provision of jobs
- The provision of drainage in this area
- Reduction in the chances of flooding
- Reduction of water lodged areas
- Reduction in flood disasters

IMPACT

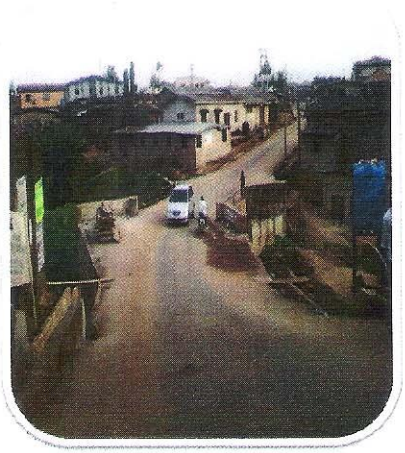
- Improve the quality of life of people in the area
- Cleaner environment, improved health
- This would reduce the breeding area for mosquitoes
- Thus reducing the rate of malaria (reduction in outpatients)
- Reduction in the usage of beds in hospitals
- Reduction in homes destroyed through flooding
- Reduction flood disaster cases such as death and loss of property
- Increase life expectancy
- Reduction in ambulance usage and emergency cases

IMPACT OF ISSAC OGUNOLU AND ORONNA LINK ROAD IFAKO-IJAYE

During



After



Impact of Isaac Ogunola and Oronna Link Road Ifako – Ijaye

OUTCOME

- It serves as a means of job creation

IMPACT

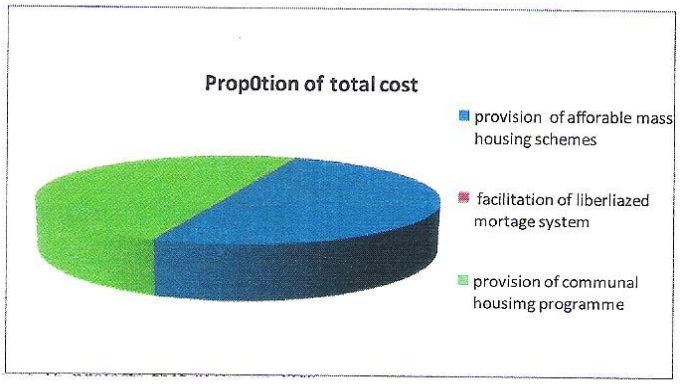
- Increased income for workers and their family
- Disposable income for the families
- Reduction in congestion and noise for the local community
- Increased accessibility
- Cleaner environment, increased health and wellbeing for the local community
- Reduces congestion
- Reduction in travel time aggregated impact the user can spend more time productively at work, or with their families, reduction in stress caused by traffic and road rage
- Reduction in road accidents, reduction in injury

Impact of Rural Development

Baseline Scenario	Benefit to local community	Economic impact	Social impact	Environmental impact	Predicted impact
Provision of transformers Provision of solar project Provision of Generators	Electricity	Economic hubs Increased investment (FDI)	Quality of life		Improved quality of life
Provision of water	Good and clean water	Economic activities	Increased Quality of life Healthier people Reduction in the probability of having typhoid	Cleaner environment Greener environment	
Provision of pit latrines	Sanitation		Healthier people	Cleaner environment	
Provision of rural roads	Accessibility	Increased economic	More time with the family (less		

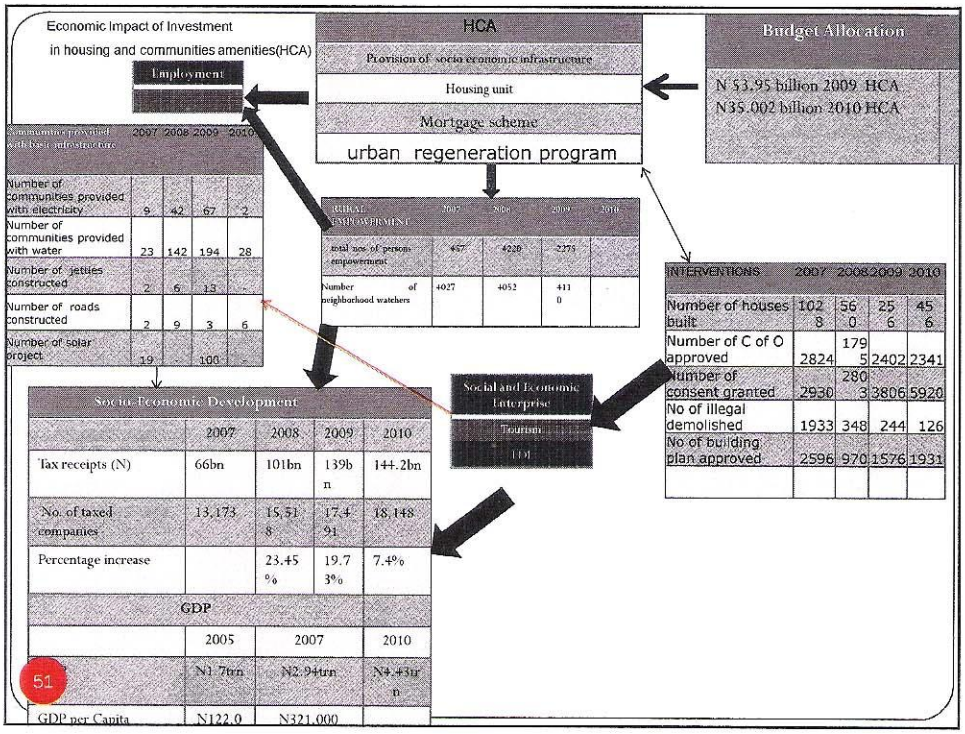
Economic Growth

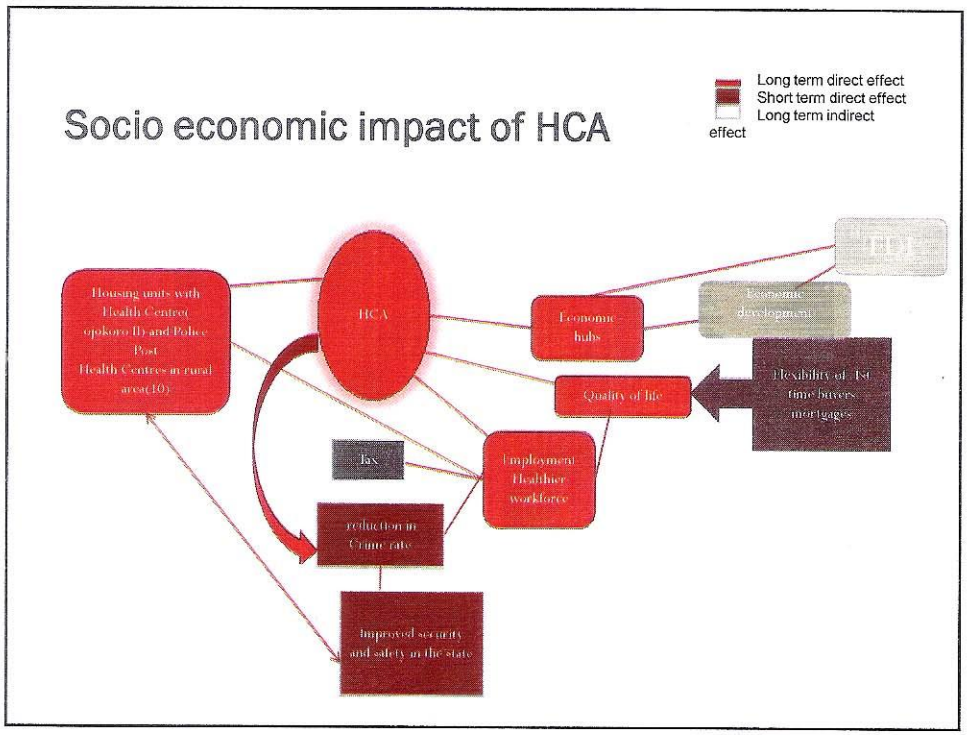
80:20 Analysis: project Objectives by Proportional Cost



Within the group of 16 projects that make up 80% and above of the total housing projects completed, half of the projects fall under provision of communal programme. It also covers the objective of provision of affordable mass housing schemes, as housing schemes are being provided, it being affordable is relative, as there is a reduction in number of houses sold

The objective of facilitation of liberalized mortgage system has a zero proportion as policies have not been implemented yet. The success of this would depend on the housing prices i.e. affordable for low income earners


Economic Impact of Investment
in housing and communities amenities(HCA)
Employment
HCA
Provision of socio economic infrastructure
Housing unit
Mortgage scheme
urban regeneration program
Budget Allocation
N 53.95 billion 2009 HCA
N35.002 billion 2010 HCA
Communities provided with basic infrastructure 2007 2008 2009 2010
Number of communities provided with electricity 9 42 67 2
Number of communities provided with water 23 142 194 28
Number of jetties constructed 2 6 13
Number of roads constructed 2 9 3 6
Number of solar project 19 100
URBAN EMPOWERMENT 2007 2008 2009 2010
total no of persons empowerment 457 4220 2275
Number of neighborhood watchers 4027 4052 4110
INTERVENTIONS 2007 2008 2009 2010
Number of houses built 1028 560 256 456
Number of C of O approved 2824 1795 2402 2341
Number of consent granted 2930 2803 3806 5920
No of illegal demolished 1933 348 244 126
No of building plan approved 2596 970 1576 1931
Socio Economic Development
2007 2008 2009 2010
Tax receipts (N) 66bn 101bn 139bn 144.2bn
No. of taxed companies 13,173 15,518 17,491 18,148
Percentage increase 23.45% 19.73% 7.4%
GDP
2005 2007 2010
N1.7trn N2.94trn N4.43trn
GDP per Capita N122.0 N321,000
Social and Economic Enterprise
Tourism
FDI
51


Socio economic impact of HCA
Long term direct effect
Short term direct effect
Long term indirect
effect
Housing units with Health Centre(opokoro II) and Police Post
Health Centres in rural area(10)
HCA
Economic hubs
FDI
Economic development
Flexibility of 1st time buyers mortgages
Quality of life
Tax
Employment Healthier workforce
reduction in Crime rate
Improved security and safety in the state

Economic Impact of HCA

- The increase in the communities provided with electricity increased by 82% in 2008, 44% in 2009 and 97.2% in 2010; there is also an increase in communities with water, this in turn has improved the standard and quality of life, as they tend to live a healthier life. The spill over effect is increased quality of the workforce in the state.

- The provision of housing units built, has led to an increase in employment.

- The positive trend in the governor's consent granted and C of O have spill over effects:

1. Reduction in the crime rate, as there has been a reduction in land related crime in civil court.
2. These document provide owners with peace of mind and it tends to avoid social unrest.

- The electronic C of O being put in place will not only reduce process time, it would also reduce fraud and land related crimes.

Economic Impact of HCA

The increase of consent granted is likely to activate economic activity as individuals are mostly using their C of O for subsequent transaction such as a collateral for loans, selling the property or building on the property. This is likely, to have contributed to the increase of tax receipts (53%, 37% and 7.4% in 2008 ,2009 and 2010 respectively).

The internal generated revenue especially from lands bureau; are used for compensation to the communities and families whose land are acquired for public interest. The land acquired are used to provide good roads, effective drainage, provision of water. The provision of the basic infrastructures has impacted positively on urban generation: this level of investment has contributed to the increase in economic productivity and GDP per capital.

Conclusion

- Immediate impact of HCA has been minimal. This is as a result of keeping its housing units until the mortgage scheme is fully implemented. Impact will be realised in the medium – long term (5yrs and beyond)

- Aggregated impact will be the flexibility for low income earners and 1st time buyers to own their own houses and increase their standard of living.

Limitation

Inadequate data

Inadequate human resources

Recommendation

- Subsidized price on housing
- Continuous investment in rural areas
- Continuous investment in compensating of local communities if the need arises to displace them.
- Data should be correlated and recorded on a monthly basis.

- There has been a continued increase in housing rent in high density areas but the growth rate decreased from 33% to 25%
- There has been a continued increase in housing rent in medium density area but the growth rate decreased from 8% in 2008 to 7% 2009.

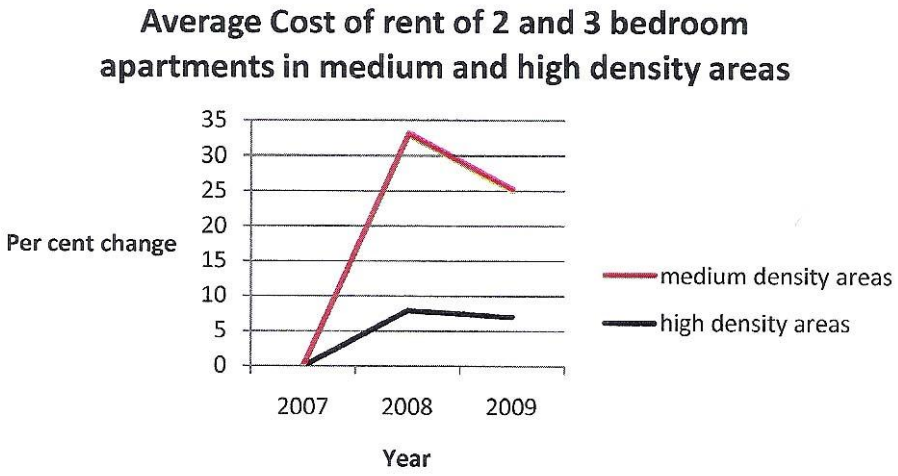
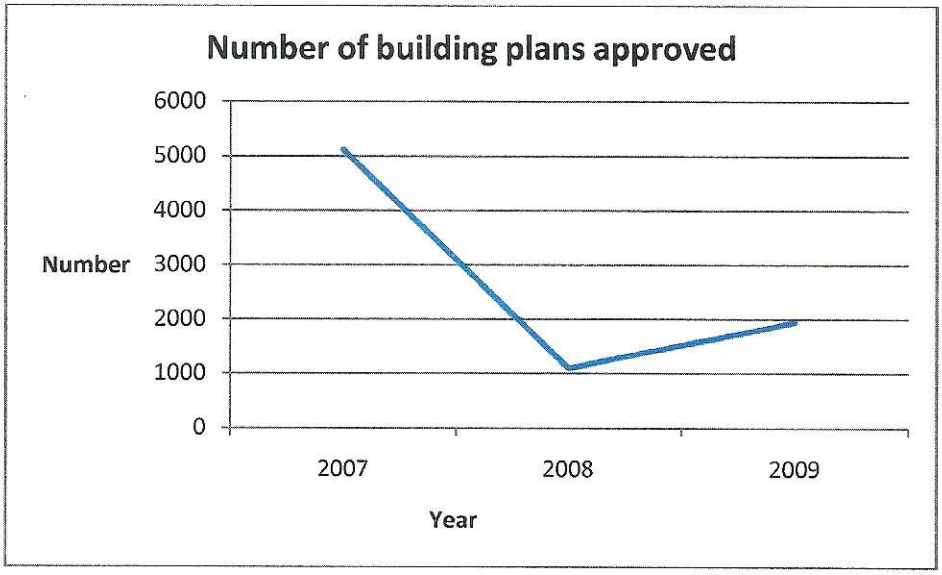
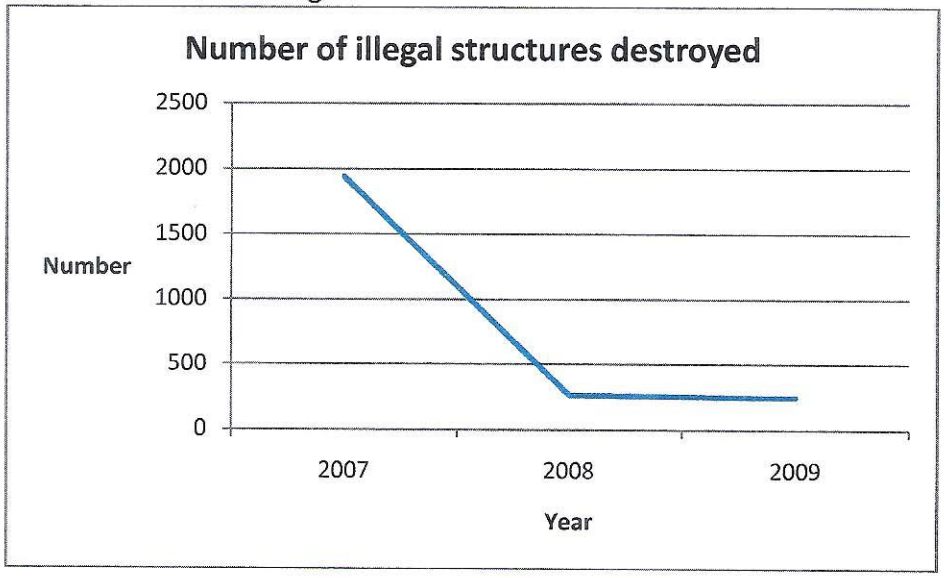


Fig. 1: Graph of the per cent change in the average cost of 2 and 3 bedroom apartments in medium and high density areas

- There was an increase in the number of housing estates renovated from 2007 to 2008 but there was no record change from 2008 to 2009.
- There has been a continued decline in the number of employees in the housing sector; however, the rate of decline slowed.
- Decline in number of housing units built; the rate of decline increased from 46% to 54%



- Continued decline in illegal structures demolished.



The Impact; Although some data is unavailable, it appears that the urbanization of the state is a little less organic than it was in 2007 as shown by the decline in number of building plans approved. It is reasonable to assume the number of building plans applications did not fall over the years. Hence, many applications were rejected probably because they were not in line with the pursuit of urban upgrading. Also, the number of building plans approved initially dropped but then it increased probably because of the stricter laws. As people started complying with the laws, the number of approved building plans climbed. Furthermore, the number of demolished illegal structures fell signaling that Lagosians are constructing fewer illegal structures.

Analysis of activities on housing amenities

INPUT

The date entry team and the KPI team got the objectives from the government pamphlet describing the responsibilities of the COFOG groups. The goals/objectives of this COFOG class as pre-defined by the government are as follows:

1. The provision of affordable mass housing scheme and the facilitation of a liberalized mortgage system as well as the new satellite town development.
2. The provision of communal housing programmes: This involves the construction of affordable estates for citizens.
3. The promotion of systematical land use for sustainable human and settlement development.
4. The provision of site and services scheme
5. The development of efficient and integrated settlements (making Lagos a model city state)
6. Promotion of systematical physical planning for sustainable development.
7. The pursuit of urban upgrading.
8. The provision of basic socio – economic infrastructure.
9. The development and integration to the rural economy.
10. The transformation of rural areas to optimum communities
11. The promotion of community driven development.

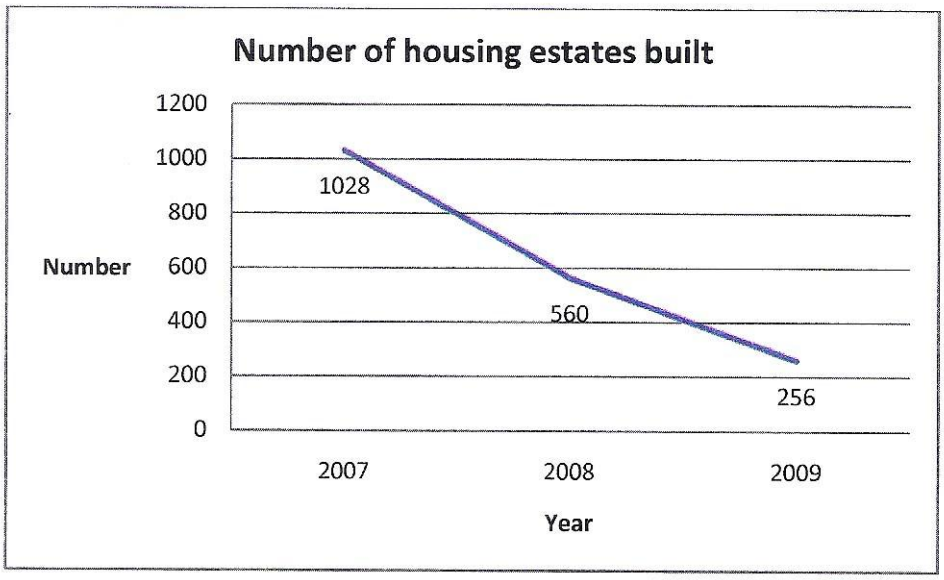
ACTIVITIES

We went to the various government ministries to source for data. We were able to obtain government documents including this data, we classified the government bodies into 9 COFOG groups and determined their objectives. After we defined specific key performance indicators (KPIs), we combed the government documents for data relevant to our KPIs. We then populated our KPI list with data. We had a few challenges because lots of data was unavailable.

OUTPUT/OUTCOME/IMPACT

We will measure the result of all data collected, and the impact based on the pre-defined goals.

1. The provision of affordable mass housing scheme and the facilitation of a liberalized mortgage system as well as the new satellite town development.



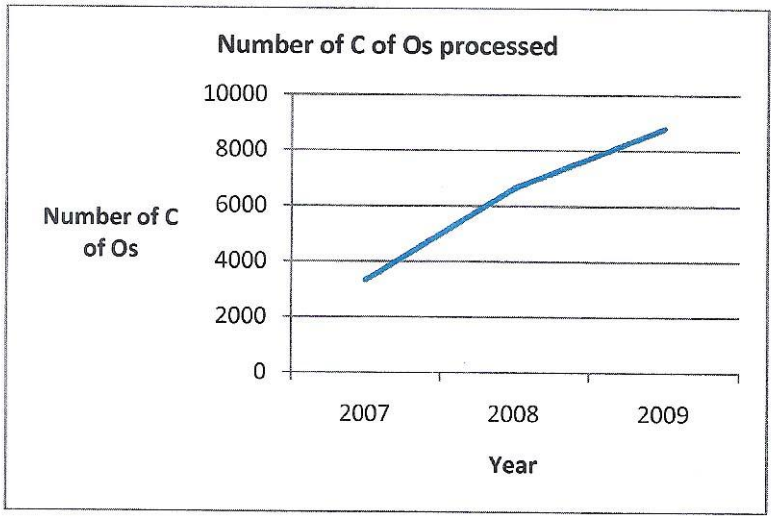
The impact: There appears to have been an increase in the nominal housing in the state but the data available is not sufficient enough for us to determine if there is an increase in real housing prices (corrected for inflation); the data doesn't show that any housing loans were granted during the period under review or that any mortgage system was developed; no new estates were built. Hence, we cannot conclusively validate the government's effectiveness in achieving the objectives.

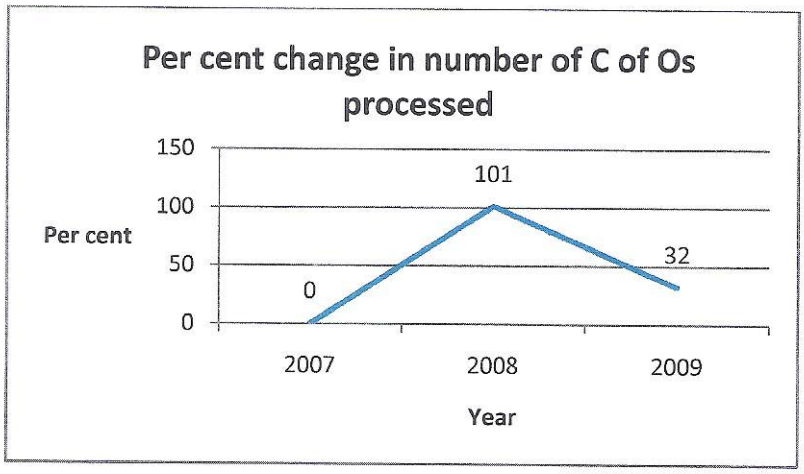
2. **The provision of communal housing programmes.**

A new estate is planned for the IjoraBadiya area

3. The promotion of systematical land use for sustainable human and settlement development.

Strong increase in the number of C of Os processed; the rate of increase declined.





Initial decline followed by an increase but the number of C of Os approved in 2009 is still below what it was in 2007

- Huge decline in C of Os revoked.

The impact: Although there was an increase in the number of C of Os processed, there was surprisingly a net decrease in C of Os approved. This suggests that the land use legislation made land use more structured and less organic over the period under review.

4. The provision of site and service scheme

- This provision would be celebrated by present and a larger pool of prospective developers who are then able to jump in and start building focusing only on the units and areas they have been allocated.

5. **The development of efficient and integrated settlements (making Lagos a model city state)**

- Efficient and integrated would mean having facilities working in a seamless and compatible manner. Everyone would know what to do and do it without being prompted or encouraged with any inducements.

6. Promotion of systematical physical planning for sustainable development

- The planning officers would be keen advocators of sustainable development. They would coax from design and ensure receiving a detailed program of how the project will be guided to a proper completion without compromise. In other countries planning approval is a matter of days or weeks maximum. The efficiency noted above would include a speedy completion to the application process bearing in mind the need for a sustainable development.

7. The pursuit of urban upgrading.

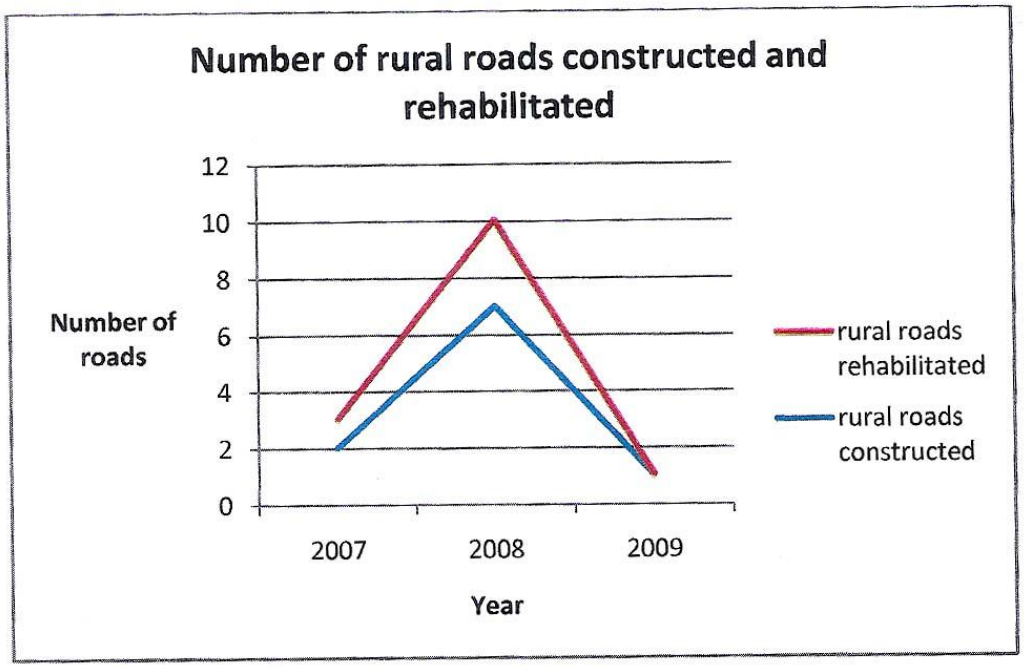
- Decline followed by an increase in number of building plans approved; the number in 2009 was much lower than it was in 2007.

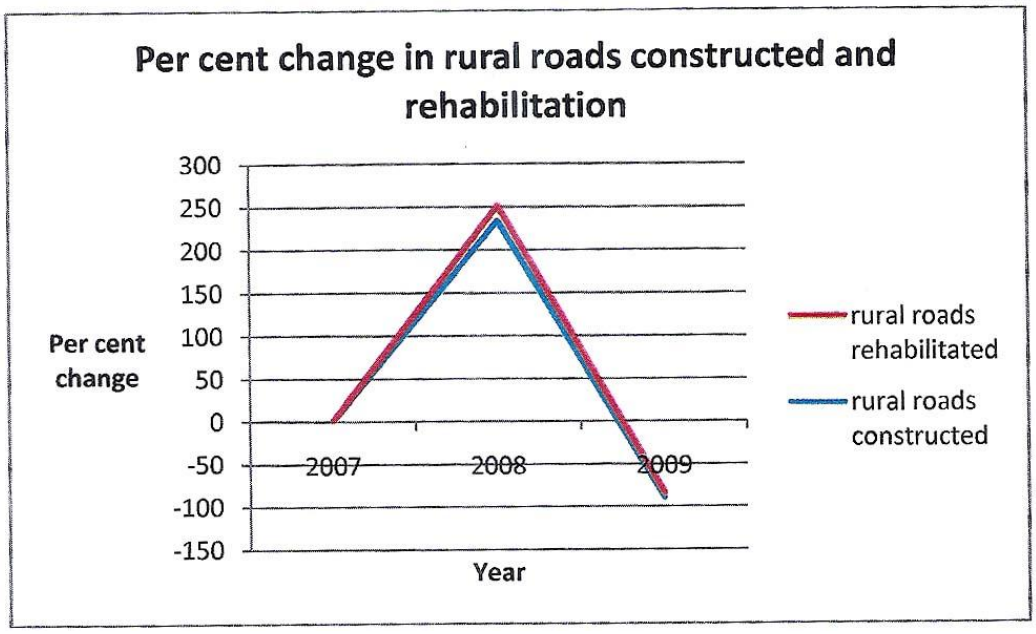
8. It is crucial that the development is completed holistically with a master plan to upgrade the urban footprint and regenerate the entire area.**The provision of basic socio-economic infrastructure.**

There was an initial increase followed by a decline in the number of rural roads c**onstructed and rehabilitated. Roads are important for** a variety of reasons especially to the developing areas. The better a road to an area is the more people are able to travel there easier. It has a direct impact on costs of construction. Transportation is easier therefore direct and indirect costs fall accordingly.

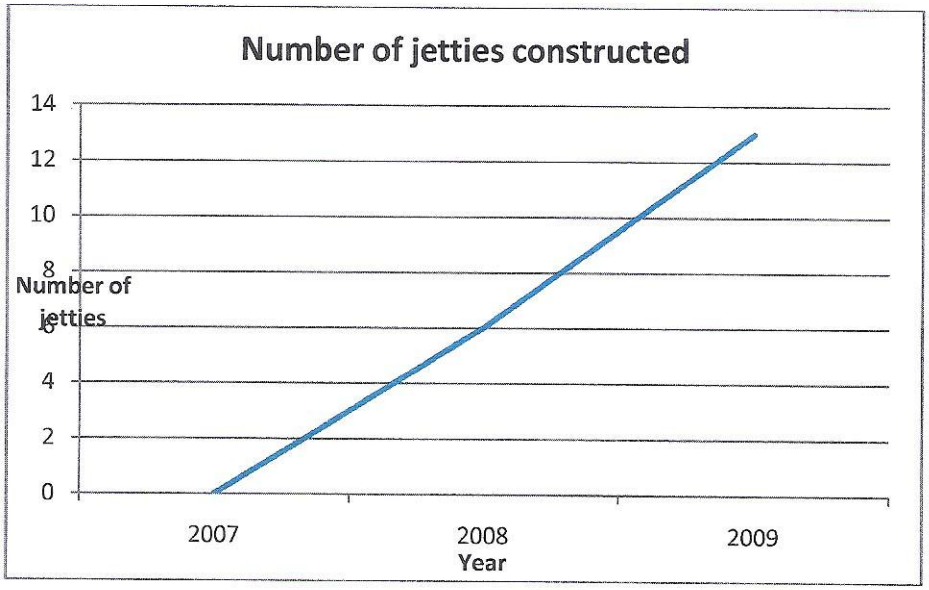
The roads come accompanied with drainages which would prevent any flooding and would be cleaned often to prevent blockages and thereby reduce the effect of disease transfer hereby improving the health conditions of the occupiers.

Number of rural roads constructed and rehabilitated





There was an increase in the number of jetties constructed



The impact: the increase investment in power is expected to have beneficial economic and social impact on the affected communities. For example, the better street lighting means the business hours can be extended and that criminals who takes advantage of darkness at night can no longer do so.

9. **The transformation of rural areas to opticom communities**

- No data available

10. **The promotion of community driven development.**

- No data available